

IMPORTANT BIRD AND BIODIVERSITY AREAS IN INDIA

Priority sites for Conservation

Revised and updated 2nd Edition Vol. II



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**Second Edition: Revised and Updated
Volume II**

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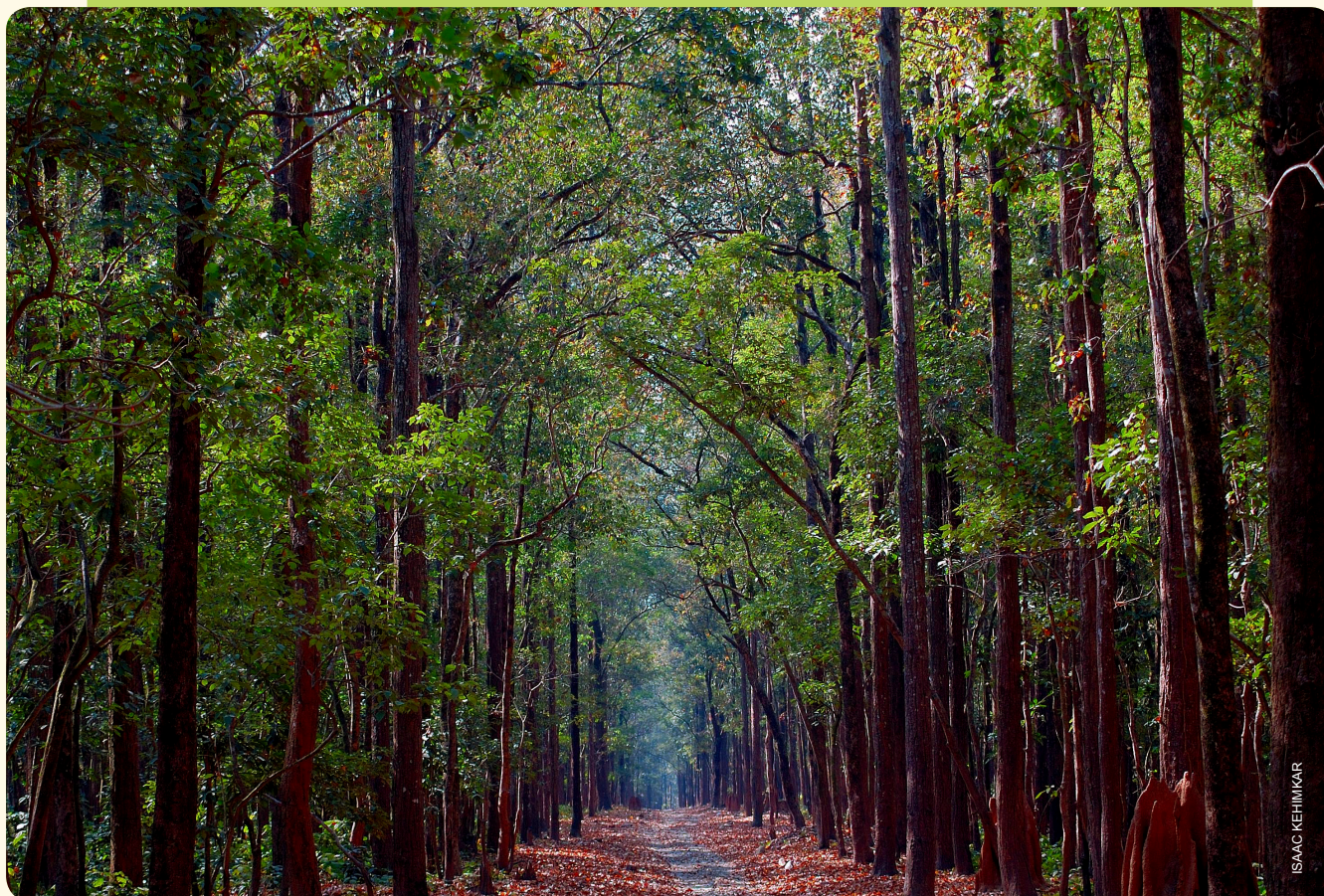
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MADHYA PRADESH



ISAAC KEHIMKAR

Madhya Pradesh has some of the most luxuriant Sal Forests left in India

Madhya Pradesh (21° 06" - 26° 30" North and 74° 00" - 82° 51" East) is the second largest state of India after Rajasthan and has a geographical area of 308,252 sq. km (9.38% of India's geographical area). Chhattisgarh bounds the State on the east, Rajasthan and Gujarat on the west, Uttar Pradesh on the north and Maharashtra on the south. It has 45 districts and the famous city of Bhopal is the capital. Earlier, Madhya Pradesh was the biggest state, but on November 1, 2000, it was divided into two states, Madhya Pradesh and Chhattisgarh. The Tropic of Cancer crosses Madhya Pradesh. The State comprises three main sections of the Deccan plateau, namely, the Central Highland, the Satpura Maikal ranges and the Eastern plateau.

The state is blessed with many rivers such as the Chambal, Narmada, Tapti, Betwa, Ken, Sone and Jamner.

The state has mainly three seasons, namely winter, summer and monsoon. The rainfall decreases from the southeast and east to the northwest and west. The average annual rainfall varies from 500 mm (Indore) to 3,000 mm (Pachmarhi) and the temperatures range from 1 °C to 48 °C.

According to the 2011 census, the total population is

72,597,565 of which 52,537,899 are rural and 20,059,666 are urban. The population density is 236 persons per sq. km.

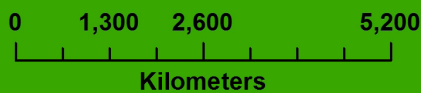
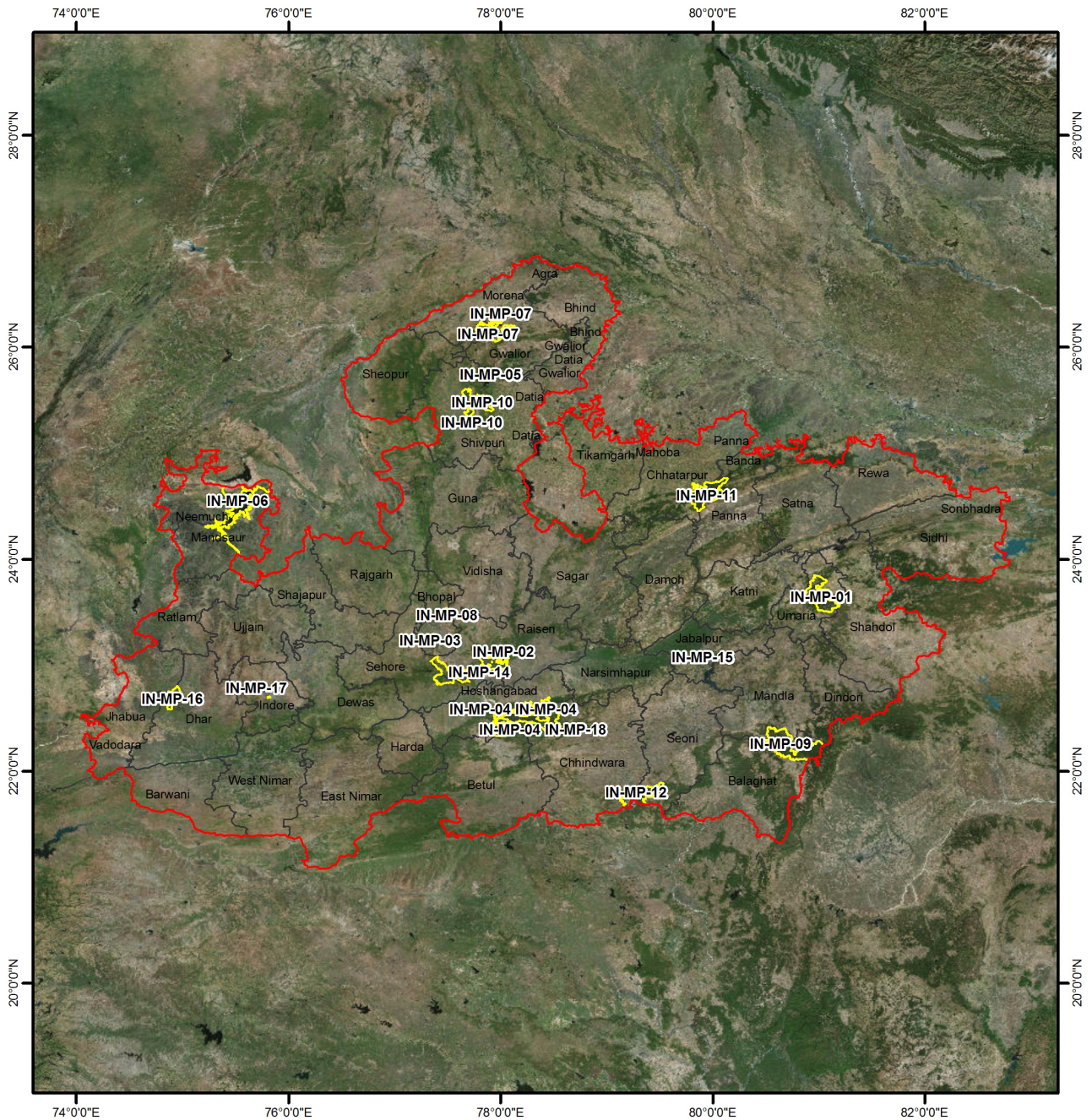
Vegetation

As per the Forest Survey of India report of 1999, there are four forest types, namely, the Tropical Moist Deciduous, Tropical Dry Deciduous, Tropical Thorn and Subtropical Broadleaf Hill Forests. The central, southern and eastern parts of the State have a better forest cover than the northern and western parts, which are deficient in forest vegetation. Teak and Sal are the two most important forest formations of the State, covering 18.0% and 16.7% forest area respectively, while miscellaneous forests cover 65.3% of the total forest area. Between 1999 and 2001, a net 2,128 sq. km has been added to the forest area of Madhya Pradesh (Ministry of Environment and Forest 2001). According to the 2011 survey the recorded forest area of the state is 94,689 sq. km, constituting 30.72% of the geographical area of the state. (Ministry of Environment and Forest 2011).

The Tropical Dry Deciduous forests harbours a large number of bird species. The numerous wetlands and

Important Bird Areas in Madhya Pradesh

IN-MP



LIST OF THREATENED BIRDS WITH IBA SITE CODES		
CRITICALLY ENDANGERED		
White-rumped Vulture	<i>Gyps bengalensis</i>	IN-MP-01, 04, 05, 08, 09, 10, 11, 12, 14, 15, 18
Long-billed Vulture	<i>Gyps indicus</i>	IN-MP-01, 04, 05, , 08, 09, 10, 11, 12, 14, 15, 18
Red-headed Vulture	<i>Sarcogyps calvus</i>	IN-MP-01, 03, 04, 05, 08, 09, 10, 11, 12, 14, 18
Great Indian Bustard	<i>Ardeotis nigriceps</i>	IN-MP-07 (Extinct?)
Sociable Lapwing	<i>Vanellus gregarius</i>	IN-MP-05 (Stray record)
ENDANGERED		
Lesser Florican	<i>Sypheotides indica</i>	IN-MP-09, 15, 16
Egyptian Vulture	<i>Neophron percnopterus</i>	IN-MP-01, 02, 05, 08, 09, 10, 11, 12, 14, 15, 18, 19
Saker Falcon	<i>Falco cherrug</i>	IN-MP-12
Black-bellied Tern	<i>Sterna acuticauda</i>	IN-MP-01, 03, 05, 10
VULNERABLE		
Asian Woollyneck	<i>Ciconia episcopus</i>	IN-MP-02, 03, 05, 09, 10, 12, 18, 19
Lesser Adjutant	<i>Leptoptilos javanicus</i>	IN-MP-01, 05, 06, 09, 10, 11
Pallas' Fish Eagle	<i>Haliaeetus leucoryphus</i>	IN-MP-02, 03, 05
Greater Spotted Eagle	<i>Clanga clanga</i>	IN-MP-02, 05, 10, 12
Eastern Imperial Eagle	<i>Aquila heliaca</i>	IN-MP-05, 10, 12
Sarus Crane	<i>Grus antigone</i>	IN-MP-01, 02, 03, 05, 08, 09, 14, 15, 17, 18
Indian Skimmer	<i>Rynchops albicollis</i>	IN-MP-10
Bristled Grassbird	<i>Chaetornis striata</i>	IN-MP-03
Green Munia	<i>Amandava formosa</i>	IN-MP-12
NEAR THREATENED		
Spot-billed Pelican	<i>Pelecanus philippensis</i>	IN-MP-05
Oriental Darter	<i>Anhinga melanogaster</i>	IN-MP-01, 03, 04, 05, 08, 10, 11, 12, 14, 19
Painted Stork	<i>Mycteria leucocephala</i>	IN-MP-02, 03, 04, 05, 08, 09, 10, 11, 12, 14, 15, 18, 19
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	IN-MP-02, 03, 04, 05, 10, 11, 12, 14, 19
Black-headed Ibis	<i>Threskiornis melanocephalus</i>	IN-MP-01, 02, 03, 04, 05, 08, 09, 10, 11, 12, 14, 18, 19
Ferruginous Duck	<i>Aythya nyroca</i>	IN-MP-05, 10, 11, 12, 14, 19
Grey-headed Fish-Eagle	<i>Ichthyophaga ichthyaeus</i>	IN-MP-01, 09, 12,
Cinereous Vulture	<i>Aegypius monachus</i>	IN-MP-04, 12
Himalayan Griffon	<i>Gyps himalayensis</i>	IN-MP-01
Pallid Harrier	<i>Circus macrourus</i>	IN-MP-09, 10, 15, 16
Red-headed Falcon	<i>Falco chicquera</i>	IN-MP-10
Laggar Falcon	<i>Falco jugger</i>	IN-MP-10
Malabar Pied Hornbill	<i>Anthraceroceros coronatus</i>	IN-MP-01, 04, 09, 12, 14
Great Thick-knee	<i>Esacus recurvirostris</i>	IN-MP-10
River Lapwing	<i>Vanellus duvaucelli</i>	IN-MP-02, 12
Eurasian Curlew	<i>Numenius arquata</i>	IN-MP-10
Black-tailed Godwit	<i>Limosa limosa</i>	IN-MP-10, 19
River Tern	<i>Sterna acuticauda</i>	IN-MP-01, 02, 03, 05, 09, 10, 12, 19
Alexandrine Parakeet	<i>Psittacula eupatria</i>	IN-MP-01, 05, 09, 14
European Roller	<i>Coracias garrulus</i>	IN-MP-03, 15

reservoirs of the state provide a refuge to a large number of migrating birds during winters. The commonest waterbirds include Coot *Fulica atra*, Red-crested Pochard *Rhodonessa rufina*, Northern Pintail *Anas acuta*, Gadwall *Mareca strepera*, Northern Shoveler *Spatula clypeata*, Bar-headed Goose *Anser indicus*, Greylag Goose *A. anser* and Ruddy Shelduck *Tadorna ferruginea*. The shallow waters and mudflats of these various wetlands are a safe haven for numerous waders.

Apart from rich avifauna, the State boasts of a wide range of terrestrial fauna. The key fauna includes large carnivores like the Tiger *Panthera tigris*, Leopard *Panthera pardus*,

Grey Wolf *Canis lupus* and Dhole *cuon alpinus*. The rare Caracal *Caracal caracal* has also been reported from some parts of the State.

The ungulates are represented by Spotted Deer *Axis axis*, Sambar *Rusa unicolor*, Nilgai *Boselaphus tragocamelus*, Gaur *Bos garus*, Chinkara *Gazella bennettii*, Four-horned Antelope *Tetracerus quadricornis*, Blackbuck *Antelope cervicapra*, Wild Buffalo *Bubalus arnee* (= *bubalis*) and Wild Boar *Sus scrofa*. Apart from these, a small population of Barasingha *Cervus duvaucelii branderi*, which is also the State Animal of Madhya Pradesh, resides in the Kanha National Park.

IBAs of Madhya Pradesh		
IBA site codes	IBA site names	IBA criteria
IN-MP-01	Bandhavgarh National Park	A1, A3
IN-MP-02	Barna Reservoir	A1, A4iii
IN-MP-03	Bhoj wetland	A1, A4i, A4iii
IN-MP-04	Bori Wildlife Sanctuary	A1, A3
IN-MP-05	Dihaila Jheel	A1, A4i, A4iii
IN-MP-06	Gandhi Sagar Wildlife Sanctuary and Reservoir	A4i, A4iii
IN-MP-07	Ghatigaon Wildlife Sanctuary	A1
IN-MP-08	Halali Reservoir	A1, A4iii
IN-MP-09	Kanha National Park	A1
IN-MP-10	Madhav National Park	A1, A4iii
IN-MP-11	Panna National Park	A1
IN-MP-12	Pench National Park	A1, A3
IN-MP-13	Rangawa Reservoir	A4iii
IN-MP-14	Ratapani Wildlife Sanctuary	A1, A4iii
IN-MP-15	Sailana Kharmor Sanctuary	A1
IN-MP-16	Sardarpur Wildlife Sanctuary	A1
IN-MP-17	Yeshwantsagar Reservoir	A1, A4i
IN-MP-18	Pachmarhi Biosphere Reserve	A1, A3
IN-MP-19	Sirpur Lake	A1, A4iii



DHIRTIMAN MUKHERJEE



ISAAC KEHIMKAR

Madhya Pradesh is known as the Tiger Capital of the World. Five Tiger Reserves and other areas have betweento... tigers. Major conservation decisions in the state are taken keeping tiger and its prey in mind

IBAs AND PROTECTED AREAS

Nine national parks across nine districts, spread over an area of 3,10,872 ha, and 25 wildlife sanctuaries covering an area of 7,60,812 ha across 19 districts of the State, have been created. Among these protected areas there are five Tiger Reserves, namely Kanha, Bandhavgarh, Panna, Pench and Bori-Satpura (Ministry of Environment and Forest 2011). Madhya Pradesh has about 19% of the tiger population of the country in these reserves, and 10% of the world's tiger population. The State has earned the sobriquet of Tiger State of the country (Jain 2001). The Pachmarhi Biosphere Reserve is one of the 18 Biosphere Reserves of the country. The Bhoj wetland is one of the Ramsar sites declared in 2002 and an IBA, located in the city of Bhopal.

In 2004, a total of 17 sites had been selected as IBAs

in Madhya Pradesh. These represent the Tropical Dry Deciduous Forest, Mixed Thorn Forest and grassland, and wetland habitats. One of the IBAs is a Biosphere Reserve which includes a national park, two wildlife sanctuaries and a wetland. Five sites are national parks, four being wildlife sanctuaries; seven are wetlands out of which three are partially or fully associated with protected areas with the remaining four being mostly unprotected by status. In the revised book, we have added one more site, Sirpur Lake that fulfills two IBA criteria.

Due to the lack of scientific bird surveys in the State, a few sites are data deficient and many potential sites might not have been included.

Three IBAs (Sailana Wildlife Sanctuary, Sardarpur Wildlife Sanctuary and Ghatigaon Wildlife Sanctuary)



Many forest birds such as Brown Fish-owl *Ketupa zeylonensis* have benefitted from protection of forests in the name of Project Tiger. Many project tiger areas has been identified as IBA

fall under Tropical Thorn Forest and Grassland and provide refuge to the highly Endangered Great Indian Bustard and Lesser Florican. While seven sites (Kanha NP, Bandhavgarh NP Ratapani WLS, Madhav NP, Panna NP, Pench NP and Pachmarhi Biosphere Reserve) represent the Tropical Dry Deciduous Forests. A substantial area of Thorn Forest and Grassland can be observed in these sites as well.

AVIFAUNA

A total of 469 species of birds has been listed in Madhya Pradesh by Grimmett and Inskipp (2003). It includes five Critically Endangered birds (White-rumped Vulture, Long-billed Vulture, Great Indian Bustard, Sociable Lapwing and Red-headed Vulture), three Endangered species (Lesser Florican, Egyptian Vulture and Black-bellied Tern) and seven Vulnerable species. The Greater Adjutant is not found in any IBA. There are only historical records of this species from Sarguja, Sehare and Balaghat districts (BirdLife International 2011). Similarly, four species of Vulnerable category have historical or stray records, hence not listed in any IBA. Of the 14 Near Threatened species recorded in Madhya Pradesh, four are not found in any existing IBA. They are the Lesser Flamingo *Phoenicopterus minor*, Lesser Fish Eagle *Ichthyaelus humilis* and Asian Dowitcher

Limnodromus semipalmatus. None of them have significant population in this State.

Many birds listed in the threatened category (BirdLife International 2011) are found in Madhya Pradesh. Critically Endangered Forest Owlet *Heteroglaux blewitti* was reported in the undivided Madhya Pradesh. Recent additions to the Critically Endangered list, the White-rumped *Gyps bengalensis* and Long-billed *Gyps indicus* Vultures though largely depleted in number, can be found all over the State. The Critically Endangered Great Indian Bustard and Sociable Lapwing *Vanellus gregarius* have long been the State's pride. Vulnerable species like the Lesser Florican *Sypheotides indicus*, Spot-billed Pelican *Pelecanus philippensis*, Lesser Adjutant *Leptoptilos javanicus*, Pallas's Fish-Eagle *Haliaeetus leucoryphus*, Greater Spotted Eagle *Clanga clanga*, Eastern Imperial Eagle *Aquila heliaca*, , Sarus Crane *Grus antigone*, , Indian Skimmer *Rynchops albigollis* and Green Munia *Amandava formosa* are among the other birds listed in the Red Data book (Birdlife International 2011) that are reported from the IBAs of the State.

Madhya Pradesh lies in Biome-11 (Indo-Malayan Tropical Dry Zone). BirdLife International (undated) has identified 59 species in this biome, out of which 52 have been reported from the State. Many of the species listed in the Biome-11 have adapted to man-modified habitats.

This biome includes a wide range of habitats, including both forests and open country. The major habitat types are Tropical Dry Deciduous Forest, Tropical Thorn Forest and Grassland. The State also have species from other biomes, for example, Biome-5, Biome-7 and Biome-8, but these birds are mainly migratory passerines moving to central India during winter.

The State does not have any Endemic Bird Area.

THREATENED SPECIES FOR WHICH MADHYA PRADESH IS IMPORTANT

White-rumped Vulture *Gyps bengalensis* Critically Endangered

About 25 years ago, White-rumped Vulture was abundant in the whole state, particularly in the Gwalior region. It was not uncommon to see 250-300 vultures of all species on a cattle carcass. The species suffered an extremely rapid population decline, particularly across the Indian subcontinent (BirdLife International 2011), mostly due to the veterinary use of the drug Diclofenac (Oaks *et al.* 2004). Even now it is seen in many areas but large flocks are gone. It has been reported breeding in many areas in the State, such as Panna NP, Bandhavgarh NP, Kanha NP and Pench NP. Occasional nests are found on large avenue trees, and sometimes in villages.

Long-billed or Indian Vulture *Gyps indicus* Critically Endangered

Like the previous species, this species has also suffered the same fate due to diclofenac poisoning. It is classified as

Critically Endangered because it has suffered an extremely rapid population decline. It breeds in south of the Gangetic plain, north to Delhi, east through Madhya Pradesh, south to the Nilgiris and occasionally further south. In Madhya Pradesh now the well-known nesting sites are in Bandhavgarh and Kanha national parks.

Great Indian Bustard *Ardeotis nigriceps* Critically Endangered

In the 1980s, two sanctuaries were specially created for the protection of this species: Karera in Shivpuri district and Ghatigaon in Gwalior district (Rahmani 1989) but due to mismanagement of the habitat by the Forest Department and conservation policies that antagonized villagers, the bustard disappeared in Karera by 1992, and from Ghatigaon by 2013. There could be 1-2 adult birds left in Tigra area of Gwalior but no recent detailed survey has been carried out in the State. The species is practically extinct in the State.

Lesser Florican *Sypheotides indica* Endangered

This species has a small, declining population, primarily as a result of the loss and degradation of grassland habitat. From Madhya Pradesh, it has been reported from the Karera Bustard WLS (Rahmani 1991), Ratlam, Sailana and Sardarpur Florican WLS (Sankaran 2000). Also there are some records from the Kanha NP. We do not know its current population in the State. All that is known is that it has declined or disappeared from many areas where it was seen 10-15 years ago.



DHRTIMAN MUKHERJEE

Although Sailana Florican Sanctuary has been notified, there is hardly any conservation action. The surrounding areas have been converted to crop fields, leaving little room for the grassland-dependent Lesser Florican



BHUSHAN PANDYA

In the last 20 years, there has been massive decline in the number of White-rumped Vulture *Gyps bengalensis*, they are still seen in remote areas of Madhya Pradesh

Sarus Crane *Grus antigone*

Vulnerable

The northern part of the State is a stronghold of Sarus, particularly in single or double crop areas with some irrigation facilities. Presence of large number of tanks, some even 200-300 years old, assures that the habitat is available to Sarus. Sarus is not molested by local people so it can live in human-dominated landscape. It is specifically reported from the National Chambal WLS about 40 birds (Choudhury *et al.* 1999), Karera Bustard WLS (Choudhury *et al.* 1999), Madhav NP (Johnson *et al.* 1993), Bandhavgarh NP (Choudhury *et al.* 1999), and Kanha NP (Newton *et al.* 1987).

THREATS AND CONSERVATION ISSUES

The IBAs of Madhya Pradesh face the threats of poaching, overgrazing by livestock, human habitation near the IBAs and forest fires. One of the main problems is firewood and timber collection and a huge area has been degraded just because of deforestation and clearance of woods and grasslands for grazing.

Poaching of wild animals takes place regularly in many areas. Targeted poaching of animals such as the Tiger and Leopard is regularly reported in the media. A number of local tribes such as the *Bahelia* and *Paradhi*, and local anti-social elements having connections with national and international smugglers pose major threats. The management has to address this issue adequately and effectively.

Crop damage by herbivores and lifting of cattle by large carnivores creates enmity between the local agriculturists and the PA authorities. This can be tackled with proper management of the buffer zone, and timely compensation for crop/livestock damage.

Some of the waterbodies where a large number of

waterbirds congregate are the Bhoj wetlands and the Rangawa Reservoir. The main threat to Bhoj is from the increasing human population of Bhopal. Waste produced by the ever-growing population is mixed with the drainage water that enters the Bhoj, thus deteriorating the water quality. Though the Lake is mesotrophic, certain patches in the Lake where sewage water gets mixed, have become eutrophic. Moreover, the Lake is losing its catchment area due to human settlements and agricultural fields. This has reduced the inflow of rainwater and could decrease the water level of the Lake. Cultural activities such as the immersion of idols and *tazias* also pose a threat to the Lake.

The villages in the catchment area of the Rangawa Reservoir are primarily dependent on agriculture. The use of toxic pesticides is prevalent, and the farmers do not know the proper quantity of pesticides that they must use. As a result, large quantities of pesticides flow into the Reservoir, the cumulative toxic effect of which is alarming.

There is pressure from the villages on the fringes of the IBAs, e.g. 13 villages still remain inside the Panna NP boundary and they are a major source of disturbance, especially their cattle and their dependence on forest products which varies in kind and quantity according to seasons. During summer, these villagers bring hordes of cattle to graze inside the Park, as there is hardly any fodder left outside. The biggest threat to Panna NP is from a plan to inter-link Ken and Betwa rivers that will result in establishment of a large reservoir that will submerge nearly 110 sq km of prime forest.

Another major long term threat is the linear development in the form of canal, transmission lines and roads. There is a massive plan to upgrade state and national highways in to six or eight lanes, and to upgrade many *katcha* forest



A panoramic view of Ken River passing through Panna Tiger Reserve. There is a plan to connect Ken and Betwa rivers and build a large water storage reservoir that will submerge more than 100 sq. km. of the Reserve

roads to tar roads. For example, the MP Government gave a proposal to upgrade roads inside Nauradehi Wildlife Sanctuary and Kanha Tiger Reserve. While no one can question the road and rail connectivity that is required for the development of the state, there should be a strong policy to develop long under-passes and over-passes (long flyovers wherever required as is done in urban centres) to avoid fragmentation of forests, and even some biodiversity rich non-forest areas.

Like in other states, grasslands and wetlands are under-represented in PA system and as a rule, neglected. These biodiversity-rich ecosystems so essential for livelihood of many rural communities are considered 'wastelands' to be developed. Urban wetlands are particularly targeted, but rural wetlands are not doing better. For example, despite being highlighted for its birdlife, Dihaila Jheel inside Karera Bustard Sanctuary is now more or less encroached upon.

Some of the protected areas do not have proper boundaries, while others have boundaries but no buffer zones, e.g. the Panna Tiger Reserve has no buffer zone which also violates the Project Tiger guidelines. This puts tremendous pressure on the natural resources of the Park due to the influx of humans.

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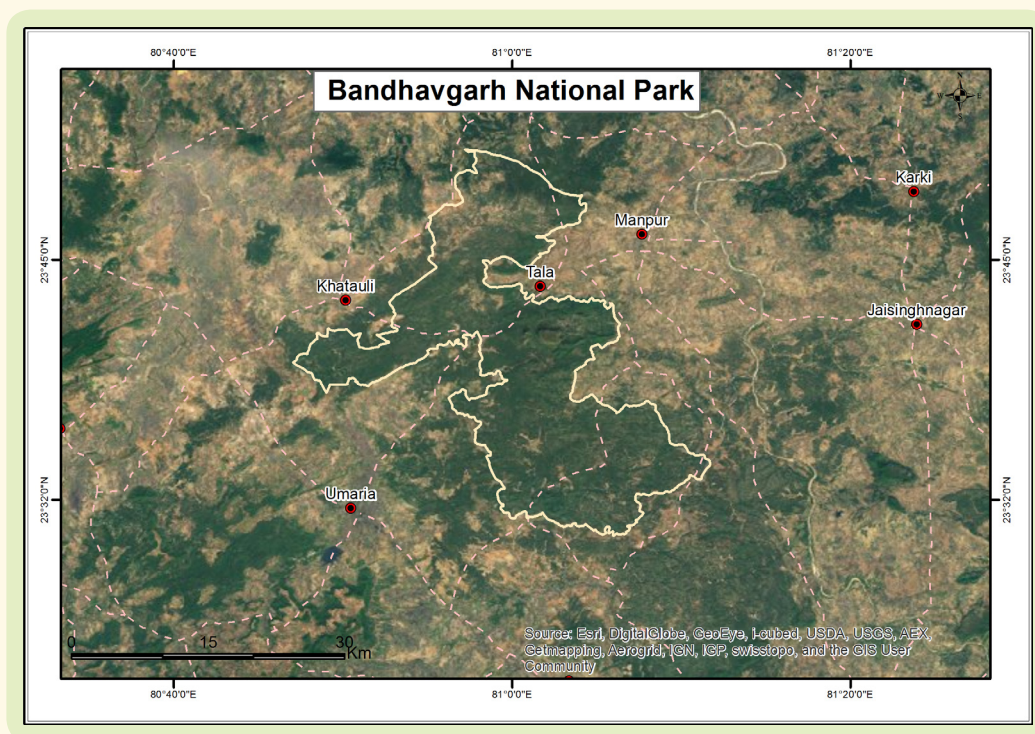
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BANDHAVGARH NATIONAL PARK

IBA Code	: IN-MP-01	Altitude	: 440–800 msl
Administrative Region (State)	: Madhya Pradesh	Rainfall	: 1,173 mm
District	: Shahdol	Temperature	: 4 °C to 42 °C
Coordinates	: 23° 35' 38" N, 81° 14' 27" E	Biogeographic Zone	: Deccan Peninsula
Ownership	: State	Habitats	: Tropical Moist Deciduous Forest, Tropical Grassland
Area	: 44,885 ha		

IBA CRITERIA: A1 (Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: National Park, established 1981. Declared as a Tiger Reserve in 1993.



GENERAL DESCRIPTION

Bandhavgarh National Park is located in Shahdol district, 195 km from Jabalpur and 210 km from Khajuraho, two major tourist spots. This famous tiger hunting area was once owned by the erstwhile Maharaja of Rewa. It was handed over by him to the Government in 1968, when privy purses and privileges were abolished, and he was unable to look after the forest wealth. Poaching was rampant and the forest lay devastated. Once it came under the administrative control of the Forest Department, Bandhavgarh's fortune took a dramatic turn. It was declared a protected area, and the animal population began to flourish. At that time, the park covered an area of 10,600 ha, all of which comprised the present day Tala Range (Tyabji 1994). In 1984, the area of the park was increased to 44,800 ha, with the inclusion of three ranges, namely Kalwa, Magadhi, and Khitauli. In 1993, the park was upgraded to a Tiger Reserve.

Bandhavgarh is fortunate in that unlike most of the other parks in India, it is not an isolated and fragmented patch of forest. It forms part of a larger forest block. Apart from the 25,000 ha Panpatha Wildlife Sanctuary that is connected with the park to the north, there are a number of smaller pockets of protected and reserve forest, interspersed with small agricultural communities (Tyabji 1994).

Bandhavgarh NP has extensive Sal forest, hills, valleys, rivers, marshes, and meadows, resulting in varied floral and faunal diversity. The forest is dominated by Sal *Shorea robusta* and Bamboo *Dendrocalamus strictus*.

The vegetation is Tropical Moist Deciduous. There are mixed forests in the higher reaches of the hills. A few rare species, such as the insectivorous plant *Drosera peltata* and medicinal plants such as Indian Buch or Sweet Flag *Acorus calamus* are found in some isolated patches of Tala Range.

Bandhavgarh is very rich in floral diversity and has more

than 600 species of flowering plants, 50 species of aquatic plants, and 18 species of rare plants. Some of the important tree species found here include Sal *Shorea robusta*, Saj *Terminalia coriacea*, Mahua *Madhuca indica*, Flame of the Forest *Butea monosperma*, Bija *Pterocarpus marsupium*, Bael *Aegle marmelos*, Banyan *Ficus bengalensis*, Jamun *Syzygium cumini*, Harra *Terminalia chebula*, Bahera *Terminalia bellirica*, Indian Gooseberry *Emblica officinalis*, Haldu *Haldina cordifolia*, Thwar *Bauhinia roxburghiana*, Semul or Red Silk Cotton *Bombax ceiba*, Pipal *Ficus religiosa*, Tendu *Diospyros melanoxylon*, Achar or Charoli *Buchanania lanzan*, Lendia *Lagerstroemia parviflora*, Dhaman *Grewia tiliifolia*, Ghont *Ziziphus xylopyrus*, Maniphal *Randia dumetorum*, Rohini or Kumkum *Mallotus philippensis*, Kumbhi *Careya arborea*, Sundew *Drosera indica*, Arjun *Terminalia arjuna*, Lasoda *Cordia dichotoma*, Ber *Ziziphus mauritiana*, Dhaora *Anogeissus latifolia*, Pakhri *Ficus virens*, and Kasahi *Bridelia squamosa* (Source: <http://www.bandhavgarh.co.in>. Accessed on 30 October 2014).

AVIFAUNA

Bandhavgarh National Park holds about 250 species of birds (Tyabji 1994). Besides the two Critically Endangered *Gyps* species, the Lesser Adjutant *Leptoptilos javanicus* and Sarus Crane *Grus antigone* are also found. An interesting difference between Kanha and Bandhavgarh (both IBAs in central India) is the almost complete absence of the Long-billed Vulture *Gyps indicus* in Kanha, while in Bandhavgarh it is just as abundant as the White-rumped *Gyps bengalensis*. The steep cliffs of Bandhavgarh Hill provide suitable nesting habitats for the Long-billed Vulture. Both these vultures are still seen in and around Bandhavgarh and moderate flocks are regularly reported in newspapers and on the internet.

The Sal and Bamboo forests of Bandhavgarh are good for the White-naped Woodpecker *Chrysocolaptes festivus*, Red Junglefowl *Gallus gallus*, Red Spurfowl *Galloperdix spadicea*, and Painted Spurfowl *G. lunulata* (Kazmierczak & Singh 1998).

Tyabji (1994) found some interesting Himalayan and Sub-Himalayan bird species such as the Plain-backed Thrush *Zoothera mollissima*, Golden-fronted Chloropsis *Chloropsis aurifrons*, Long-tailed Minivet *Pericrocotus ethologus*, Grey Bush-chat *Saxicola ferreus*, and Dusky Warbler *Phylloscopus fuscatus*. This proves that these species are more widely distributed and abundant than was believed earlier. Ashy Drongo *Dicrurus leucophaeus*, long considered to be a winter visitor from the Himalaya, is also found here (Rajah Jayapal, pers. comm. 2014)

In January 2002, Rufous-gorgeted (=Orange-gorgeted) Flycatcher *Ficedula strophilata* was seen near a resort close to Bijaria village (D'Cunha 2005). Till then, there was no record of this species in central India. According to Ali & Ripley (1987) and Grimmett *et al.* (2011), it is an altitudinal

CRITICALLY ENDANGERED	
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
ENDANGERED	
Egyptian Vulture	<i>Neophron percnopterus</i>
Black-bellied Tern	<i>Sterna acuticauda</i>
VULNERABLE	
Lesser Adjutant	<i>Leptoptilos javanicus</i>
Sarus Crane	<i>Grus antigone</i>
NEAR THREATENED	
Oriental Darter	<i>Anhinga melanogaster</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Grey-headed Fish-eagle	<i>Ichthyophaga ichthyaelus</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>
Malabar Pied Hornbill	<i>Anthraceroceros coronatus</i>
BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE	
Red-napped Ibis	<i>Pseudibis papillosa</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
White-eyed Buzzard	<i>Butastur teesa</i>
Painted Francolin	<i>Francolinus pictus</i>
Jungle Bush-quail	<i>Perdicula asiatica</i>
Painted Spurfowl	<i>Galloperdix lunulata</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Mottled Wood-owl	<i>Strix ocellata</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyrceros birostris</i>
Brown-headed Barbet	<i>Psilopogon (Megalaïma) zeylanicus</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
White-naped Woodpecker	<i>Chrysocolaptes festivus</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix griseus</i>
Rufous-winged Lark	<i>Mirafra assamica</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
White-bellied Minivet	<i>Pericrocotus erythropygus</i>
Blue-capped Rock-thrush	<i>Monticola cinclorhynchus</i>
Indian Robin	<i>Saxicoloides fulvicata</i>
Tawny-bellied Babbler	<i>Dumetia hyperythra</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Ashy Prinia	<i>Prinia socialis</i>
Jungle Prinia	<i>Prinia sylvatica</i>
White-browed Fantail	<i>Rhipidura aureola</i>
Chestnut-tailed Starling	<i>Sturnus malabaricus</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>

migrant and winters in the Himalayan foothills.

The Malabar Pied Hornbill *Anthraceroceros coronatus*, a Near Threatened species, is resident in the Western Ghats, eastern India, and Sri Lanka (Grimmett *et al.* 2011). Regular sightings of this species in Bandhavgarh (Tyabji 1994), sometimes up to 13 individuals, including subadults,

indicate that it is more widely distributed in central India than was believed earlier.

The Sarus Crane *Grus antigone* breeds in this area; one chick was seen in July 1989 (Tyabji 1994). Four to six Sarus Cranes are seen in Magdhi Range of the Park (Sangeeta Rajgir, pers. comm. 2014).

There are recent sight records of Black-capped Kingfisher *Halcyon pileata*, Peregrine Falcon *Falco peregrinus*, Red-headed Vulture *Aegypius calvus*, Himalayan Griffon *Gyps himalayensis*, and Grey-headed Fish-eagle *Ichthyophaga ichthyaeetus* (Sangeeta Rajgir, pers. comm. 2014).

The site can be included in Biome 11 (Indo-Malayan Tropical Dry Zone). Out of the 59 species listed by BirdLife International (undated) for Biome 11, 32 are found in this IBA. Bandhavgarh has been selected as an IBA on the basis of the presence of Threatened species (A1), and also species of Biome 11 (A3).

OTHER KEY FAUNA

Bandhavgarh National Park is the place where the famous White Tigers of Rewa were discovered. The last known capture of a white tiger was in 1951..Bandhavgarh is well-known for its tigers, and due to their high density, the possibility of good sightings is high compared to other national parks of Central India. In addition to tigers, there are many different species of mammals in Bandhavgarh

which form a good prey base for tigers. The faunal assemblage is typical of central Indian species. There are 37 species of mammals, including Leopard *Panthera pardus*, Jungle Cat *Felis chaus*, Nilgai *Boselaphus tragocamelus*, Chinkara *Gazella gazella*, and Four-horned Antelope *Tetracerus quadricornis* among antelopes, Grey Wolf *Canis lupus*, Dhole *Cuon alpinus*, Golden Jackal *Canis aureus*, and Indian Fox *Vulpes bengalensis* among canids, Sambar *Rucervus unicolor*, Spotted Deer *Axis axis*, Muntjac or Barking Deer *Muntiacus muntjak* among deer, and Gaur *Bos gaurus*. Striped Hyaena *Hyaena hyaena*, Sloth Bear *Melursus ursinus*, Common Langur *Presbytis entellus*, Rhesus Macaque *Macaca mulatta*, Wild Boar *Sus scrofa*, Small Indian Civet *Viverricula indica*, Common Palm Civet *Paradoxurus hermaphroditus*, Ratel or Honey Badger *Mellivora capensis*, Ruddy Mongoose *Herpestes smithi*, Common Mongoose *Herpestes edwardsi*, Indian Pangolin *Manis crassicaudata*, Indian Tree Shrew *Anathana ellioti*, and Grey Musk Shrew *Suncus murinus*. Four species of bats, namely Fulvous Fruit Bat *Rousettus leschenaulti*, Flying Fox *Pteropus giganteus*, Indian False Vampire *Megaderma lyra*, and Indian Pipistrelle *Pipistrellus coromandra* are reported to occur (Source: <http://www.bandhavgarh.co.in>. Accessed on 30 October 2014). Indian Guar has been successfully reintroduced in the park. More than 80 species of butterflies are reported from the park.



DHRTMAN NUKHERJEE

Upto 250 species of birds have been identified in Bandhavgarh NP including many globally threatened species. Bandhavgarh is also a good representative of Biome 11 (Indo-Malayan Tropical Dry Zone)

B. NAVANEETHAN



Madhya Pradesh forest department has done commendable job by reintroducing Gaur *Bos gaurus* in the park. Such type of active conservation measures should be taken for other species and in other areas

LAND USE

- Agriculture
- Tourism and recreation
- Nature conservation and research
- Sericulture
- Poultry farming
- Watershed management

THREATS AND CONSERVATION ISSUES

- Poaching
- Livestock grazing
- Human habitation inside the site
- Forest fires
- Collection of timber and firewood
- Man-animal conflict

Excessive grazing pressure in the buffer area is a major problem. There are about 7,000 heads of cattle in 14 villages located inside Bandhavgarh TR. Besides this, about 50,000 cattle from the surrounding villages also graze in the park.

Poaching of wild animals, which come out of the core area, regularly takes place. Targeted poaching of animals such as the Tiger and Leopard is regularly reported in the media. A number of local tribes such as Bahelia and Paradhi, and local anti-social elements having connections with national and international smugglers, pose a major threat. The management has to address this issue adequately and effectively.

Crop damage by herbivores and cattle lifting by large carnivores creates enmity between the local agriculturists and the park authorities. This can be tackled with proper management of the buffer zone, and timely compensation for crop/livestock damage.

Villages have been relocated from the core area, reducing the anthropogenic pressure on the wildlife. The pressure of increasing number of tourists has been alleviated, as the number of vehicles is strictly controlled by the forest department (Sangeeta Rajgir, *pers. comm.* 2014).

KEY CONTRIBUTORS

Sangeeta Rajgir, M. Khaliq.

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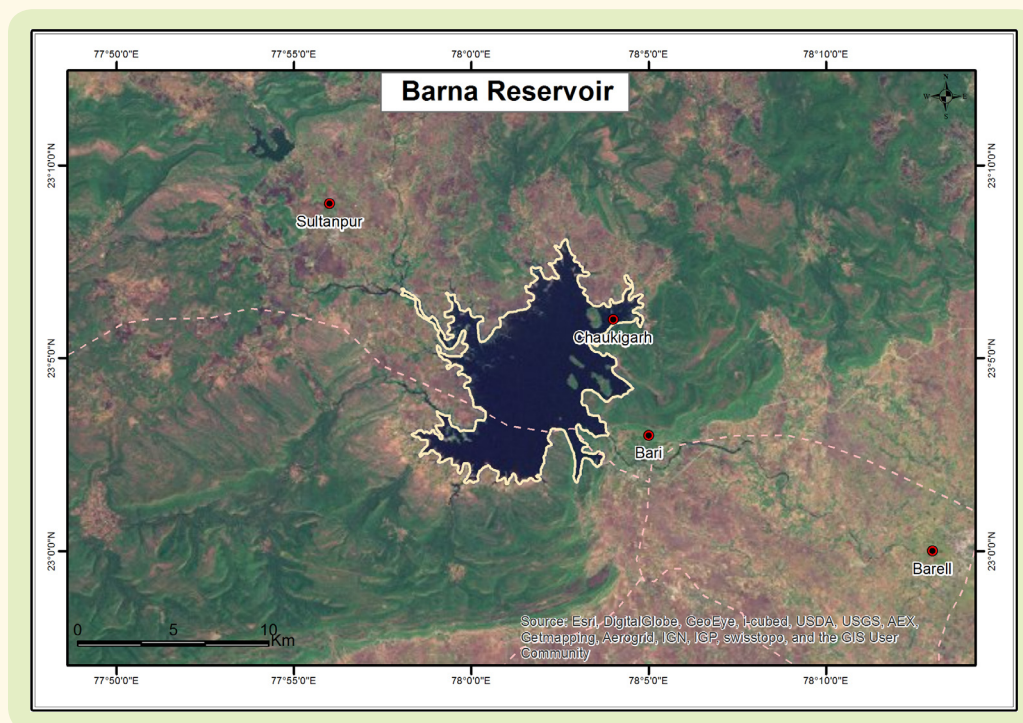
BARNARRESERVOIR

IN-MP-02

IBA Code	: IN-MP-02	Area	: 7 7,700 ha
Administrative Region (State)	: Madhya Pradesh	Altitude	: 349 msl
District	: Raisen	Rainfall	: 117 cm
Coordinates	: 23° 04' 60" N, 78° 07' 00" E	Temperature	: 8 °C to 46 °C
Ownership	: State	Biogeographic Zone	: Deccan Peninsula
		Habitats	: Freshwater Wetland

IBA CRITERIA: A1 (Threatened species), A4iii (≥20,000 waterbirds)

PROTECTION STATUS: Partially protected, located beside two Wildlife Sanctuaries.



GENERAL DESCRIPTION

Barna Reservoir is located on the National Highway NH-12, c. 85 km from Bhopal, the state capital and c. 45 km from the nearest railhead, Obedullaganj. It is one of the most important waterbodies of Raisen district. The reservoir has dense forest on three sides, and shares its perimeter with two sanctuaries, as its bund is situated inside Singhori WLS while the backwaters lie inside Ratapani WLS (an IBA).

Barna Reservoir, apart from being a perennial water source to the animals of these sanctuaries, provides refuge to thousands of migratory birds during winter. It is mainly used for fishing and irrigation, and was created by damming the Barna river under the Narmada Valley Project. The reservoir looks like an amoeba when seen from above, with large numbers of bays and meandering inland channels, surrounded on both sides by forest or agricultural

land. These extensive belts of shallow water are ideal for waterfowl and waders.

The forest around Barna is typical Mixed Dry Deciduous. Most of the forest is open and subject to heavy biotic pressure. Apart from natural vegetation, the reservoir shares its boundary with miles of agricultural land.

This IBA was proposed as a Ramsar Site (Islam & Rahmani 2008) as it qualifies for Ramsar Criteria 2 (wetland supports threatened ecological communities), and Criteria 5 (wetland regularly supports 20,000 or more waterbirds).

AVIFAUNA

No detailed study has been conducted on the waterbirds of Barna Reservoir, but a preliminary survey in the winter of 2001–2002 revealed a huge congregation of more than 20,000 birds on the main waterbody (Koustubh Sharma,

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Sarus Crane	<i>Grus antigone</i>
Asian Woollynecked	<i>Ciconia episcopus</i>
Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>
Greater Spotted-eagle	<i>Clanga clanga</i>

NEAR THREATENED

Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Painted Stork	<i>Mycteria leucocephala</i>
River Lapwing	<i>Vanellus duvaucelii</i>
River Tern	<i>Sterna aurantia</i>

pers. comm. 2002). In a recent study, 64 species of birds were reported from Barna Reservoir (Vyas *et al.* 2013), including Threatened species like Pallas's Fish-eagle *Haliaeetus leucoryphus*, Greater Spotted-eagle *Clanga clanga*, River Lapwing *Vanellus duvaucelii*, River Tern *Sterna aurantia*, and Black-headed Ibis *Threskiornis melanocephalus*. Balapure *et al.* (2013) mention the presence of 64 bird species including Near Threatened species such as Painted Stork *Mycteria leucocephala*. The Asian Woollynecked *Ciconia episcopus*, which has been uplisted to Vulnerable by BirdLife International in 2014, is regularly seen here.

This site easily qualifies for A4iii criteria (site known or thought to hold on a regular basis $\geq 20,000$ birds: BirdLife International, undated). Among the conspicuous birds, large flocks of Common Coot *Fulica atra* and Red-crested Pochard *Netta rufina* were seen in the deeper portions of the reservoir. This site has not been investigated during the Asian Waterfowl Census, and needs regular monitoring of waterfowl and other birds.

Villagers reported the nesting of Sarus Crane *Grus antigone* in agricultural land, where the Sarus traditionally enjoys protection. The Near Threatened Black-necked Stork *Ephippiorhynchus asiaticus* is also seen, but breeding has not been recorded.

The surrounding forest and agricultural fields have 30 species of birds listed in Biome 11 (Indo-Malayan Tropical Dry Zone: BirdLife International, undated). However, most of these species are presently common and widely distributed, hence of low conservation importance.

OTHER KEY FAUNA

A moderately significant population of Tiger *Panthera tigris*, Leopard *Panthera pardus*, and Dhole *Cuon alpinus* is reported from Ratapani WLS as well as Singhori WLS that surround Barna Reservoir. Apart from these large mammals, Striped Hyaena *Hyaena hyaena*, Golden Jackal

Canis aureus, and Jungle Cat *Felis chaus* constitute the main carnivore population. The herbivore population includes Cheetal *Axis axis*, Sambar *Rucervus unicolor*, Nilgai or Blue Bull *Boselaphus tragocamelus*, Four-horned Antelope *Tetracerus quadricornis*, Chinkara *Gazella bennettii*, Blackbuck *Antelope cervicapra*, and Wild Boar *Sus scrofa*.

LAND USE

- Fishing
- Irrigation
- Tourism and recreation

THREATS AND CONSERVATION ISSUES

- Poaching
- Fishing
- Encroachment
- Pesticide runoff from agricultural fields

As agricultural fields border the reservoir, the danger of pesticides reaching the reservoir water and accumulating in different trophic levels, is very high. No study has been conducted on this threat.

Apart from this, changeover from traditional crops to cultivation of cash crops threatens the presence of many birds including the Sarus Crane *Grus antigone*. Poaching and illegal exploitation of the reservoir for fishing are persistent threats.

Although the site is not popular among hunters and poachers from outside due to difficulty in reaching the birds, rich and influential local people frequently hunt here.

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Koustubh Sharma, Sangeeta Rajgir, M. Khalique.

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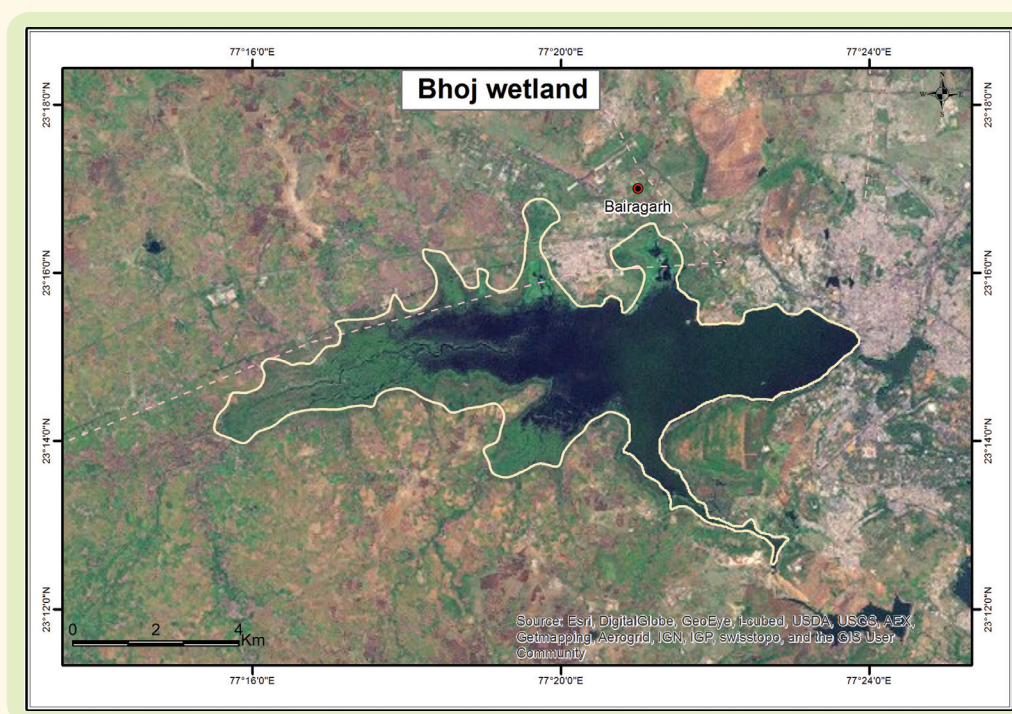
BHOJ (UPPER LAKE) WETLAND

IN-MP-03

IBA Code	: IN-MP-03	Altitude	: 523 msl
Administrative Region (State)	: Madhya Pradesh	Rainfall	: 1,180 mm
District	: Bhopal	Temperature	: 10 °C to 44 °C
Coordinates	: 23° 13' 40" N, 77° 21' 38" E	Biogeographic Zone	: Semi-arid
Ownership	: State	Habitats	: Freshwater Reservoir, Tropical Dry Deciduous Forest, Tropical Secondary Scrub
Area	: 3,072 ha		

IBA CRITERIA: A1 (Threatened species), A4i (1% of biogeographical population of congregatory waterbirds), A4iii (≥20,000 congregatory waterbirds)

PROTECTION STATUS: National Park, established 1982. Ramsar Site, declared 2002.



GENERAL DESCRIPTION

Bhoj Wetland comprises two contiguous man-made reservoirs, the Upper Lake and the Lower Lake. The Upper Lake was created by Raja Bhoj in the 11th century by the construction of an earthen dam across the Kolans river, and the Lower Lake was constructed nearly 200 years ago, largely from the overflow of water from the Upper Lake. Both the lakes are urban waterbodies, located in the rapidly growing city of Bhopal, the state capital. Bhoj Wetland was designated as a Ramsar Site in November, 2002 (Islam & Rahmani 2008). It qualifies for Ramsar Criteria A1 (Threatened species), A4i (1% or more biogeographic population of a species, i.e., Sarus Crane), and A4iii (≥20,000 waterbirds).

The Upper Lake is surrounded by Van Vihar National Park on the south, human settlements on the east and north, and agricultural fields on the west. The Lower Lake is surrounded by human settlements on all sides. The Upper Lake is a major source of potable water for Bhopal.

The Upper Lake is very rich in biodiversity, particularly resident and migratory birds, macrophytes, phytoplankton, zooplankton, both natural and cultured fish species, insects, reptiles, and amphibians. A management action plan has been implemented since 1995, with financial support from the Government of Japan. As part of this management plan, to follow up the impact on birds, an 18-month study was undertaken in 2000–2001, which helped in documenting the avifauna of the site. During this study, more than 20,000

CRITICALLY ENDANGERED	
Red-headed Vulture	<i>Aegypius calvus</i>
ENDANGERED	
Black-bellied Tern	<i>Sterna acuticauda</i>
VULNERABLE	
Asian Woollyneck	<i>Ciconia episcopus</i>
Pallas' Fish-eagle	<i>Haliaeetus leucoryphus</i>
Sarus Crane	<i>Grus antigone</i>
Bristled Grassbird	<i>Chaetornis striata</i>
NEAR THREATENED	
Oriental Darter	<i>Anhinga melanogaster</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
River Tern	<i>Sterna aurantia</i>
European Roller	<i>Coracias garrulus</i>

waterbirds (A4iii criteria) were recorded.

A belt of deciduous forest, with cliffs and steep contours towards the south-eastern boundary of the lake comprises Van Vihar National Park. The greater part of the long western and south-western peripheries of the site is covered with a mix of semi-desert and secondary scrub, semi-arid grassland, arable land, improved pasture land, perennial crop cultivation, and forestry plantation. The extensive forestry plantation, being still young, around the lake boundaries augurs well for avian diversity in the near future.

AVIFAUNA

Nearly 210 species of birds are reported from the wetland, along with the surrounding forest areas (Sharma 2002). In the peak season, the population of waterbirds exceeds 35,000 (Koustubh Sharma, *pers. comm.* 2003). Therefore, the site qualifies for A4iii criteria. Eurasian Coot *Fulica atra* is the most numerous waterbird, followed by the Red-crested Pochard *Netta rufina*. In some years, its population exceeds 2,000 individuals. According to Wetlands International (2012), its 1% threshold is 1,000.

The Near Threatened Black-necked Stork *Ephippiorhynchus asiaticus* is also seen regularly, but no nest has been found. However, a solitary juvenile was seen in the spring of 2002 (Koustubh Sharma, *pers. comm.* 2003). Four individuals were also seen, all singly.

One of the most notable records is the sighting of more than 120 Sarus Crane *Grus antigone*. According to Wetlands International (2012), the 1% threshold of Sarus crane is 90. Therefore, this site easily qualifies for A4i criteria also. More recently, 160 Sarus Crane (>1% of the reported total population in India) have been counted here by Nandi (2006).

According to Nandi (2006) in the year 2000, the Sarus Crane population in the zone southwest to west of the wetland was found to be fewer than 10. However, during

February to May, 2001, it showed a dramatic increase, with a peak of 161 cranes in the month of April, 2001. No such change was observed in the south-eastern zone of the wetland, where the observed population was fewer than 10 during the entire period of the study. According to a recent paper (Rajgir & Khalique 2012), there is a small population of c. 12 Sarus Crane breeding along the backwaters of the wetland.

Large congregations of waterfowl attract many predators, such as Pallas's Fish-eagle *Haliaeetus leucocephalus* and Western Marsh Harrier *Circus aeruginosus*. Pallas's Fish-eagle was seen twice in 2001. We do not have recent sight records.

Vyas *et al.* (2010) reported the occurrence of 43 bird species in this IBA, including Painted Stork *Mycteria leucocephala*, Sarus Crane, and River Tern *Sterna aurantia*.

Many bird species were added to the checklist of Bhoj wetland over the years (Sangeeta Rajgir, *pers. comm.* 2013). Two Greater Flamingo *Phoenicopterus roseus* were sighted on January 1, 2009. Black-bellied Tern *Sterna acuticauda* was sighted in 2006. Bristled Grassbird *Chaetornis striata* was rediscovered by Pratap Singh in 2006. There are records of many interesting species, namely Grey-necked Bunting *Emberiza bethanani*, Asian Woollyneck *Ciconia episcopus*, Red-napped Ibis *Pseudibis papillosa*, Glossy Ibis *Plegadis falcinellus*, Eurasian Spoonbill *Platalea leucorodia*, Stork-billed Kingfisher *Pelargopsis capensis*, Blue-tailed Bee-eater *Merops philippinus*, Indian Pitta *Pitta brachyura*, Clamorous Reed-warbler *Acrocephalus stentoreus*, and Blyth's Reed-warbler *Acrocephalus dumetorum*. Winter visitors such as Osprey *Pandion haliaetus*, Western Marsh Harrier *Circus aeruginosus*, Pied Avocet *Recurvirostra avosetta*, and Spotted Redshank *Tringa erythropus* are being sighted regularly now. Black-crowned Night-heron *Nycticorax nycticorax* is found breeding here. There are occasional sightings of Peregrine Falcon *Falco peregrinus* and European Roller *Coracias garrulus*.

OTHER KEY FAUNA

The Upper Lake shares its boundaries with Van Vihar National Park. Unique in itself, the park supports rich populations of Chital *Axis axis*, Wild Boar *Sus scrofa*, Nilgai *Boselaphus tragocamelus* and Sambar *Rucervus unicolor*, that roam wild inside. Many other animals are also kept in enclosures inside the park, which is also a zoo. The western and south-western parts of the site are generally devoid of much terrestrial wild fauna, apart from the occasional sighting of Golden Jackal *Canis aureus* and Indian Fox *Vulpes bengalensis*. Due to a vast stretch of shallow water, they also support huge populations of birds during winter.

More than 10 species of reptiles and amphibians, more than 40 species of fish, and around 100 species of insects have been identified in the Upper Lake (Sharma 2002).

The backwater has a good population of crocodiles (Raju Kasambe, *pers. obs.* 2014).

LAND USE

- Domestic water management
- Tourism and recreation
- Aquaculture

THREATS AND CONSERVATION ISSUES

- Poaching and trapping
- Siltation
- Eutrophication
- Influx of sewage water
- Toxic waste from hospitals and factories
- Use of pesticides in agriculture
- Encroachment on the catchment area
- Cultivation of aquatic plants
- Shooting range nearby creates disturbance to waterfowl and other fauna.
- Unmanaged distillation programme disturbs the aquatic ecosystem, reduces food and shelter for waterfowls.
- Electrical decorations inside the water under the “Sairsapata” scheme launched by the Department of Tourism, Madhya Pradesh create disturbance to waterfowl.

The increasing human population of Bhopal is the most important threat. Waste produced by the ever-growing population is mixed with the drainage water that enters the lake, deteriorating the water quality. Though the lake is mesotrophic, certain patches where sewage water enters, have become eutrophic. Moreover, the lake is losing its catchment area due to human settlements and agricultural fields. This has reduced the inflow of rain water and could decrease the water level. Cultural activities such as the immersion of idols and *tazias* also pose a threat to the lake.

Conservation action taken

1. The National Green Tribunal has ordered a ban on encroachment and construction activity in a 100 meter periphery of Upper Lake
2. The local IBCN partner, Bhopalbirds, conducts a community awareness programme to reduce the use of pesticides in agricultural land on the periphery of the lake.
3. Bhopal Municipal Corporation has banned the immersion of idols in Upper Lake.

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Koustubh Sharma, P.K. Nandi, Sangeeta Rajgir, M. Khalique, Raju Kasambe.

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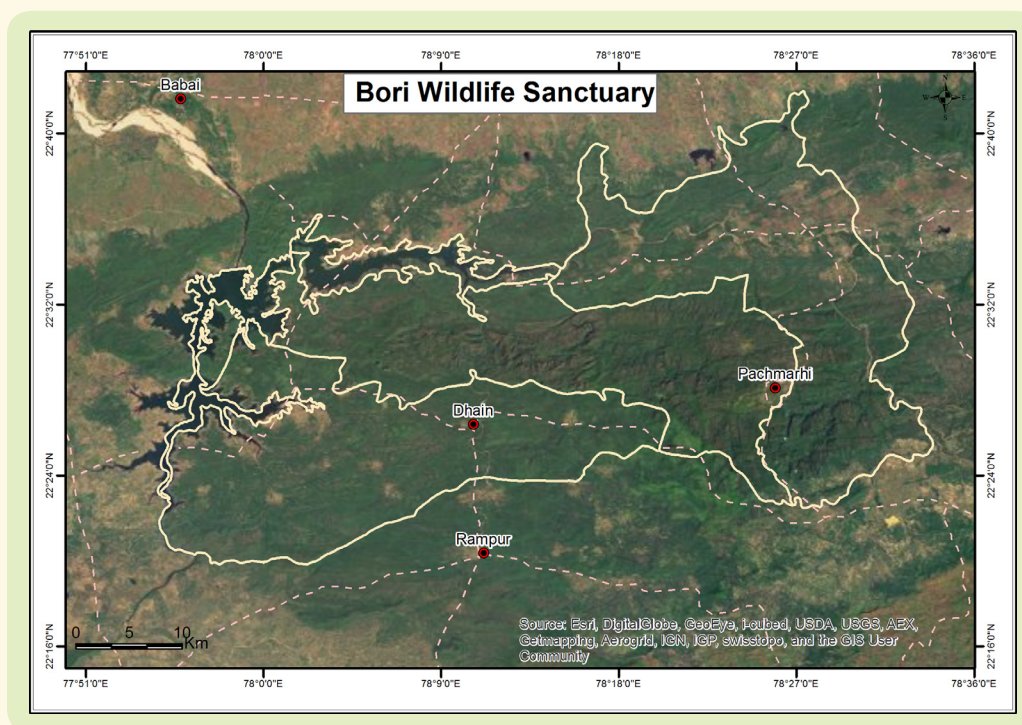
BORI WILDLIFE SANCTUARY

IBA Site Code	: IN-MP-04	Area	: 48,572 ha
Administrative Region (State)	: Madhya Pradesh	Altitude	: 300–1,352 msl
District	: Hoshangabad	Rainfall	: 1,750 mm
Coordinates	: 22° 33' 22" N, 78° 17' 47" E	Temperature	: 6 °C to 47 °C
Ownership	: State	Biogeographic Zone	: Deccan Peninsula
		Habitats	: Tropical Dry Deciduous Forest

IN-MP-04

IBA CRITERIA: A1 (Threatened species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: Wildlife Sanctuary, established 1981.



GENERAL DESCRIPTION

Bori Wildlife Sanctuary, now a part of Satpura Tiger Reserve, gets its name from the River Bori. It lies on the southern slopes of the Satpura Hills in Hoshangabad district. It has the distinction of being the first forest reserve declared in India (Pai 1993). Mahadeo Ranges, which form a part of Satpura National Park and Pachmarhi Sanctuary, demarcate this sanctuary to the north, while the River Tawa forms its western and southwestern boundaries. Several streams and rivulets of the Bori and Sonbhadra rivers provide water inside the sanctuary. The terrain varies from steep slopes in the east to plain or undulating land in the west.

According to Champion & Seth (1968), Bori has South Indian Moist Deciduous Forest, sub-type Moist Teak Forests. It has many riparian forests along the streams. This area lies in the Teak and Sal transition zone which

makes it very interesting from the faunal point of view. Bori WLS was intensively worked for Teak and Bamboo till 1991.

A combination of different climatic and edaphic factors at different altitude levels has given rise to rich and luxuriant tropical flora, including rare species of mosses and ferns, making it a perfect place for botanical excursions and research.

AVIFAUNA

More than 250 species of birds are reported from this IBA (Mehta 2000). BirdLife International (undated) has identified 59 species of birds in Biome 11 (Indo-Malayan Tropical Dry Zone). In this IBA, 35 Biome-11 species are seen, perhaps the highest number known to occur in any IBA in central India.

Besides Biome 11 avifauna, three species of Biome 10



Along with tiger and leopard, wild dog is the main predator of large number of ungulates found in Bori Wildlife Sanctuary

(Indian Peninsula Tropical Moist Zone) are also found. These are Malabar Pied Hornbill *Anthracoceros coronatus*, Malabar Whistling Thrush *Myophonus horsfieldii*, and Indian Scimitar-babbler *Pomatorhinus horsfieldii* (Mehta *et al.* 2005).

Bori has both Grey *Gallus sonneratii* and Red *Gallus gallus* Junglefowl, which are reported to hybridize in this area (Ali & Ripley 1987).

OTHER KEY FAUNA

Almost all large and small mammals of central India are found in Bori. Till now, 25 species of mammals have been recorded, from Tiger *Panthera tigris*, Leopard *P. pardus*, Wild Dog *Cuon alpinus* to Mouse Deer or Chevrotain *Moschiola indica*. Three species of antelope are found: Nilgai *Boselaphus tragocamelus*, Four-horned Antelope *Tetracerus quadricornis*, and Chinkara *Gazella bennettii*. Bori is also famous for its herds of wild Gaur *Bos gaurus*.

The Indian Giant Flying Squirrel *Petaurista philippensis* and Indian Giant Squirrel *Ratufa indica* occur here. The largely nocturnal Common Palm Civet *Paradoxurus hermaphroditus* and Small Indian Civet *Viverricula indica* are present (Sangeeta Rajgir, *pers. comm.*).

Numerous streams, dense foliage, wild flowers, woodland edges, and damp patches attract hundreds of butterflies such as the Plain Tiger *Danaus chrysippus*, Common Jezebel *Delias eucharis*, Common Mormon *Papilio polytes*, Common Emigrant *Catopsilia pomona*, Common Sailor *Neptis hylas*,

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Cinereous Vulture	<i>Aegypius monachus</i>
Malabar Pied Hornbill	<i>Anthracoceros coronatus</i>

and Orange Oakleaf *Kallima inachus*. Panarpani, close to Pachmarhi, is a great place to study butterflies (Sangeeta Rajgir, *pers. comm.*).

LAND USE

- Agriculture
- Human habitation
- Tourism and recreation
- Nature conservation and research

THREATS AND CONSERVATION ISSUES

- Poaching
- Livestock grazing
- Lopping of trees
- Human habitation in the marginal area
- Firewood collection
- Unsustainable exploitation of forest resources
- Exploitation of rare medicinal plant



PRACHI MEHTA

Bori WLS lies in the Teak and Sal transition zone which makes it very important from the conservation point of view. More than 250 species of birds have been listed till now including 34 Biome 11 (Indo-Malayan Dry Zone) species

About 5,000 cattle from 24 surrounding villages graze inside the sanctuary. Reclamation of land around Bunglapura has led to the destruction of large tracts of virgin forest.

The main attraction of the sanctuary is the Tiger. The sanctuary draws a large number of tourists mainly from January to June. Since the place is a prominent tourist spot for seeing tigers and prehistoric rock paintings, there are many forest bungalows and guesthouses which serve as lodgings for tourists. A variety of safaris and nature walks attract hundreds of tourists to this IBA.

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Koustubh Sharma, Prachi Mehta, Sangeeta Rajgir, M. Khalique.

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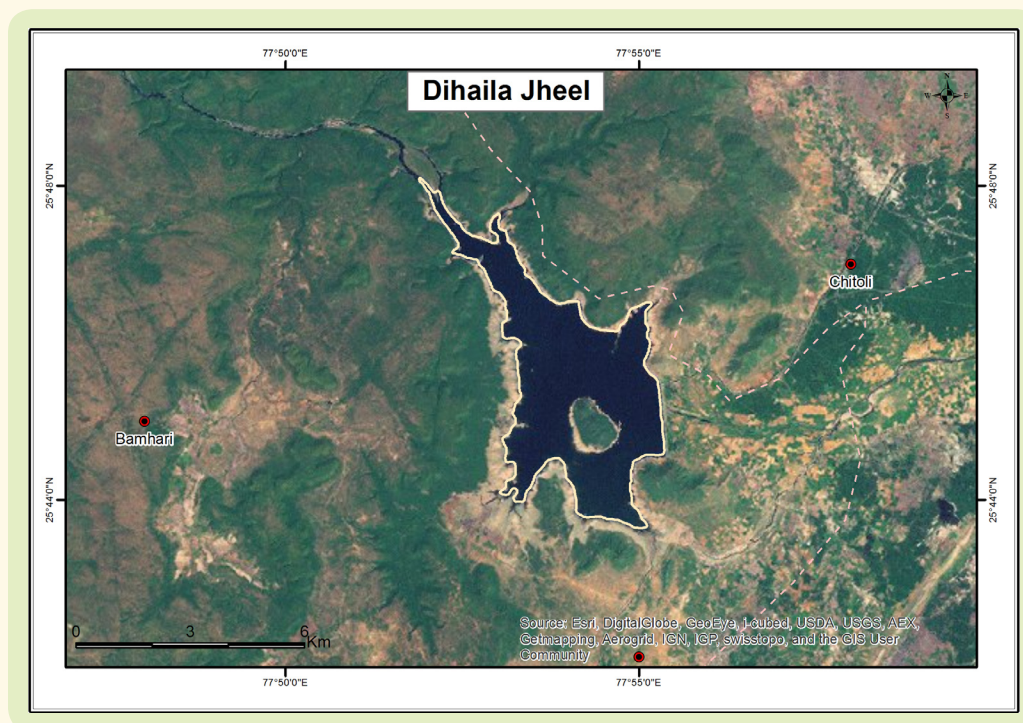
DIHAILA JHEEL AND OTHER WETLANDS

IN-MP-05

IBA Code	: IN-MP-05	Area	: c. 371 ha
Administrative Region (State)	: Madhya Pradesh	Altitude	: 370 msl
District	: Shivpuri	Rainfall	: 825 mm
Coordinates	: 25° 41' 44" N, 78° 09' 59" E	Temperature	: 17 °C to 32 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Freshwater Swamp

IBA CRITERIA: A1 (Threatened species), A4i (1% biogeographical population of waterbirds), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Dihaila Jheel is part of Karera Bustard Sanctuary which was notified in 1981.



GENERAL DESCRIPTION

The Karera Bustard Sanctuary in Shivpuri district encloses one of the richest wetlands of the state, Dihaila Jheel. Being entirely rain-fed, the size of the *jheel* varies from year to year, depending on the monsoonfall received between July and September. Two barrages help to impound the water, which is released through sluice gates for irrigation. Being used in all possible ways, the *jheel* is an extremely important feature of the area. Dihaila Jheel is of great economic value to the local people as it provides water for irrigation during years of good rainfall, cultivable land during poor rainfall years, and pasture for livestock as the *jheel* dries out (Rahmani 1987).

A variety of birds find a haven in the *jheel* throughout the year. These include resident, breeding, and Palearctic migratory birds.

As the Great Indian Bustard *Ardeotis nigriceps* is no longer found in Karera Bustard Sanctuary (Rahmani 2002), and there does not appear to be any chance for its revival, only Dihaila Jheel is being taken as an IBA.

Besides Dihaila, there are many more man-made waterbodies in Karera Bustard Sanctuary. The important ones are Ronija tank (10–15 ha), Barsori-Fatehpur tank (30–40 ha), Berkhera tank (104 ha), Karhai-Ramgarha (20 ha), and Gadha tank (20 ha). All these waterbodies are included in Dihaila Jheel IBA.

AVIFAUNA

A wide range of species of birds can be seen in and around Dihaila Jheel. With the onset of the monsoon in late June or early July, hundreds of Lesser Whistling-duck *Dendrocygna javanica*, Knob-billed Duck *Sarkidiornis*

melanotos, Spot-billed Duck *Anas poecilorhyncha*, Cotton Teal or Pygmy Goose *Nettapus coromandelicus*, Pheasant-tailed Jacana *Hydrophasianus chirurgus*, Little Grebe *Tachybaptus ruficollis*, as well as egrets and storks occupy the newly inundated areas. The Teal, Knob-billed Duck, and Spot-billed Duck soon leave the *jheel* to nest elsewhere. By September-October, migratory Palearctic birds start arriving. Among ducks, the first to arrive is the Northern Pintail *Anas acuta*, one of the most common ducks in India. Within a few days, Garganey *Querquedula querquedula*, Northern Shoveller *Spatula clypeata*, Wigeon *A. penelope*, Common Teal *A. crecca*, Gadwall *Mareca strepera*, Red-crested Pochard *Netta rufina*, Common Pochard *Aythya ferina*, White-eyed or Ferruginous (Pochard) *Aythya nyroca*, and Tufted Duck *A. fuligula* cover the *jheel*. Flocks consisting of forty to fifty thousand ducks are not uncommon. Huge dense flocks of the Ruff *Philomachus pugnax*, sometimes consisting of 20,000–30,000 birds, are found in the inundated paddyfields, near the *jheel*. They move around in restless flocks. By mid-November, Bar-headed Geese *Anser indicus* and Greylag Geese *A. anser* arrive. Up to 1,500 were counted in 1986 (Rahmani 1988). The influx is seen again on their return migration in end March and early April.

Asian Woollyneck *Ciconia episcopus*, Asian Openbill *Anastomus oscitans*, Black-necked Stork *Ephippiorhynchus asiaticus*, and Painted Stork *Mycteria leucocephala* are commonly seen at Dihaila. There are also a few records of White Stork *Ciconia ciconia*. First observed in 1982, the Greater Flamingo *Phoenicopterus roseus* has been regularly visiting the area since. In 1988, even a Siberian Crane *Grus leucogeranus* was sighted for about three months (Hussain *et al.* 1988–1989).

The Greater Spotted-eagle *Clanga clanga*, Tawny Eagle *A. rapax*, Osprey *Pandion haliaetus*, Peregrine Falcon *Falco peregrinus*, Pallas's Fish-eagle *Haliaeetus leucoryphus*, and Western Marsh Harrier *Circus aeruginosus* comprise the six species of raptors that are seen at the *jheel*. There are many more in the surrounding grasslands and crop fields (Rahmani 1991). Resident Sarus Cranes *Grus antigone* and migrant Demoiselle Crane *Grus virgo* are a regular feature at the site. Two or three pairs of Sarus are found around Dihaila, and some more pairs in other wetlands of the sanctuary (Rahmani 1991).

A total of 27 species of waders have been identified in the *jheel* and surrounding areas. A graduated feeding habitat with dry, marshy, and submerged areas occurring in close proximity is provided to the waders as the water of the *jheel* recedes.

At the onset of winter, when the paddy is just ripening, farmers face the difficulty of protecting their crops from depredation by migratory ducks.

No fewer than 100,000 waterfowl are regularly present during winter in Dihaila Jheel and other water bodies in the

Karera Bustard Sanctuary (Rahmani 1987). Dihaila also serves as a moulting ground for the Comb Duck *Sarkidiornis melanotos* during winter, when a few hundred birds become flightless for two to three weeks.

Bird ringing was done in Dihaila and other waterbodies by BNHS between 1985 and 1989, when some interesting records were made. For instance, a male Greater Scaup *Aythya marila* was ringed on November 23, 1985 (Natarajan & Sugathan 1987). The species is an uncommon migrant to large waterbodies in north India.

In the winter of 2012 when more than 90% of the water had dried out, only about 3,000 waterbirds were counted in the *jheel*. The *jheel* was almost completely drained and cultivation was going on in the bed. Herds of Blackbuck were seen in the cultivated land. During a bird count, the following prominent birds were recorded (Sangeeta Rajgir, *pers. comm.*): Demoiselle Crane (01), Greylag Goose (1,000), Bar-headed Goose (700), Ruddy Shelduck (50), Comb Duck (500), Northern Pintail (500), Northern Shoveller (200), Indian Spotbilled Duck (100), Painted Stork (20), Glossy Ibis (06), Asian Woollyneck (12), Eurasian Marsh Harrier (02), Egyptian Vulture (06), White-rumped Vulture (05), and Red-headed Vulture (01).

OTHER KEY FAUNA

Unfortunately, the Great Indian Bustard became locally extinct in this area in 1993–1994. Among mammals, Blackbuck *Antelope cervicapra*, Chinkara *Gazella bennettii*, Grey Wolf *Canis lupus*, Golden Jackal *Canis aureus*, and

CRITICALLY ENDANGERED

Siberian Crane (stray record)	<i>Grus leucogeranus</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
Sociable Lapwing (stray record)	<i>Vanellus gregarius</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
Black-bellied Tern	<i>Sterna acuticauda</i>

VULNERABLE

Asian Woollynecked	<i>Ciconia episcopus</i>
Lesser Adjutant	<i>Leptoptilos javanicus</i>
Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>
Greater Spotted-eagle	<i>Clanga clanga</i>
Eastern Imperial-eagle	<i>Aquila heliaca</i>
Sarus Crane	<i>Grus antigone</i>

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Ferruginous Duck	<i>Aythya nyroca</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>

Indian Fox *Vulpes bengalensis* are found in the area. Nilgai or Blue Bull *Boselaphus tragocamelus* was not found in the mid 1980s, but it is now seen in increasing numbers.

LAND USE

- Irrigation
- Agriculture
- Nature education

THREATS AND CONSERVATION ISSUES

- Denotification of Karera Bustard Sanctuary
- Extensive human intervention in the area
- Animosity to wildlife developing among people due to crop damage by Blackbuck

Threat of Denotification

Before the establishment of Karera Bustard Sanctuary, Dihaila Jheel was a popular hunting ground for wildfowl. However, once it was declared a sanctuary, adequate protection was given to all wildlife in the area. Dihaila Jheel has now been identified as an IBA in danger (Kasambe and Surve, 2013).

Tremendous pressures by local politicians and villagers risk the very existence of this waterbody.

Furthermore, plans to build a canal to bring water from more than 50 km away form part of the main irrigation plan of the Mohini Sagar Project. Once completed, the canal will greatly increase the irrigation facilities inside the sanctuary. Also, the water of Dihaila Jheel may no longer be required for irrigation, and if so, there is the danger that the *jheel* will be drained and cultivated. On the other hand, the canal may even increase the water inflow to the *jheel*, increasing its water retaining capacity for a much longer period through regular refilling. There is an urgent need to protect the natural water regime of the wetland, in collaboration with the villagers. If necessary, the Government of Madhya

Pradesh should purchase this wetland and declare it as a national park.

Karera Bustard Sanctuary used to have nearly 2,000 Blackbuck *Antelope cervicapra* and a fairly large number of Indian Gazelle *Gazella bennettii* but now both have decline massively due to hunting and killing by irate villagers. As the bustards have disappeared from this sanctuary, and due to public pressure, the National Board for Wildlife and the Government of Madhya Pradesh have decided to denotify the sanctuary. The decision is now awaiting final approval from the Supreme Court of India, and should it come through, the sanctuary will become the country's first such reserve to lose official recognition after the flagship species has been lost (Kasambe & Surve 2013).

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Asad R. Rahmani, Sangeeta Rajgir, M. Khalique, Raju Kasambe.

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GANDHISAGAR RESERVOIR

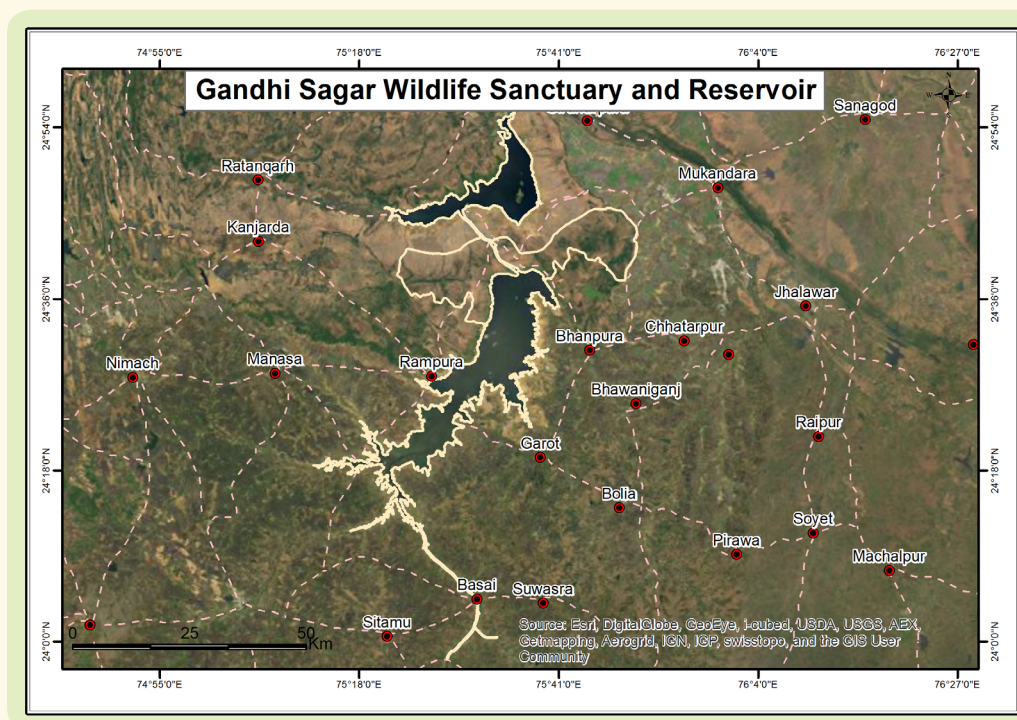
IBA Code	: IN-MP-06
Administrative Region (State)	: Madhya Pradesh
District	: Neemach, Mandsaur
Coordinates	: 24° 36' 03" N, 75° 40' 41" E
Ownership	: State
Area	: 36,862 ha

Altitude	: 399 msl
Rainfall	: 786 mm
Temperature	: 9 °C to 45 °C
Biogeographic Zone	: Semi-arid
Habitats	: Wetland, Dry Deciduous Forest

IN-MP-06

IBA CRITERIA: A4i (1% population of waterbirds), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Wildlife Sanctuary, notified in 1974, enlarged in 1983.



GENERAL DESCRIPTION

Gandhisagar is, areawise, the second largest reservoir in the country, next only to Hirakud in Orissa. It is formed by an impoundment on the River Chambal. The dam which took 16 years to construct was completed in 1970. It is 513 m long with a height of 62 m. The Chambal river passes through the sanctuary, dividing it into two parts. The western part is in Neemach district and the eastern part in Mandsaur district. The Chambal, at the dam site, is fed by the catchment areas from the Vindhya ranges to the south and Aravalli to the northeast, covering a drainage area of 23,025 sq. km. The maximum length and width of the reservoir are 68 and 26 km respectively, while the sanctuary is 36,700 ha in area. Gandhisagar Dam is one among the four dams of the Integrated Chambal Development Programme. Shared by Mandsaur

and Neemach districts, the Gandhisagar reservoir and adjoining Gandhisagar Wildlife Sanctuary are c. 130 km from Mandsaur. The sanctuary has many places of historical, archaeological, and religious importance.

The forests in the wildlife sanctuary were the hunting reserves of the ruling Holkar family of Indore. Until a few decades ago, these forests were dense and full of wildlife. Unfortunately, due to over-exploitation and unrestricted hunting, the area has become depleted both in flora and fauna.

AVIFAUNA

Gandhisagar Reservoir draws a large number of migratory and non-migratory birds throughout the year. This reservoir can easily qualify for A4iii criteria, i.e., congregation of 20,000 or more waterbirds. There are

reports of Lesser Adjutant *Leptoptilos javanicus* and flamingos *Phoenicopterus* spp. This reservoir is also famous for its large numbers of Bar-headed Goose *Anser indicus*. Although no proper census of this species has been conducted, its population could easily reach the 1% threshold determined by Wetlands International (2012). As the waterspread is very large and difficult to assess, the number and species composition of other waterfowl is also not known, but many would easily cross the 1% population threshold.

Despite the lack of information on waterfowl, and considering its large size and suitability of habitat for waterbirds, we have included Gandhisagar as an IBA, based on A4i and A4iii criteria.

LAND USE

- Irrigation
- Electrical power generation
- Fishing
- Tourism and recreation

THREATS AND CONSERVATION ISSUES

- Excessive fishing
- Pesticides run-off

As the reservoir is under the control of the irrigation and fisheries departments, it is used for fishing. Overfishing by small mesh size nets poses a hazard to avifauna.

Pesticide run-off from the surrounding agricultural fields is another danger, which has not been studied properly. Hunting of waterfowl continues near villages, but the large-scale hunting of earlier days has stopped. Gandhisagar Reservoir is a good subject for studies on the impact of man-made reservoirs on the distribution pattern of local and migratory waterfowl.

KEY CONTRIBUTOR

Koustubh Sharma.

KEY REFERENCE

Wetlands International (2012) *Waterbirds Population Estimates: Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, The Netherlands. (online version).

GHATIGAON BUSTARD SANCTUARY

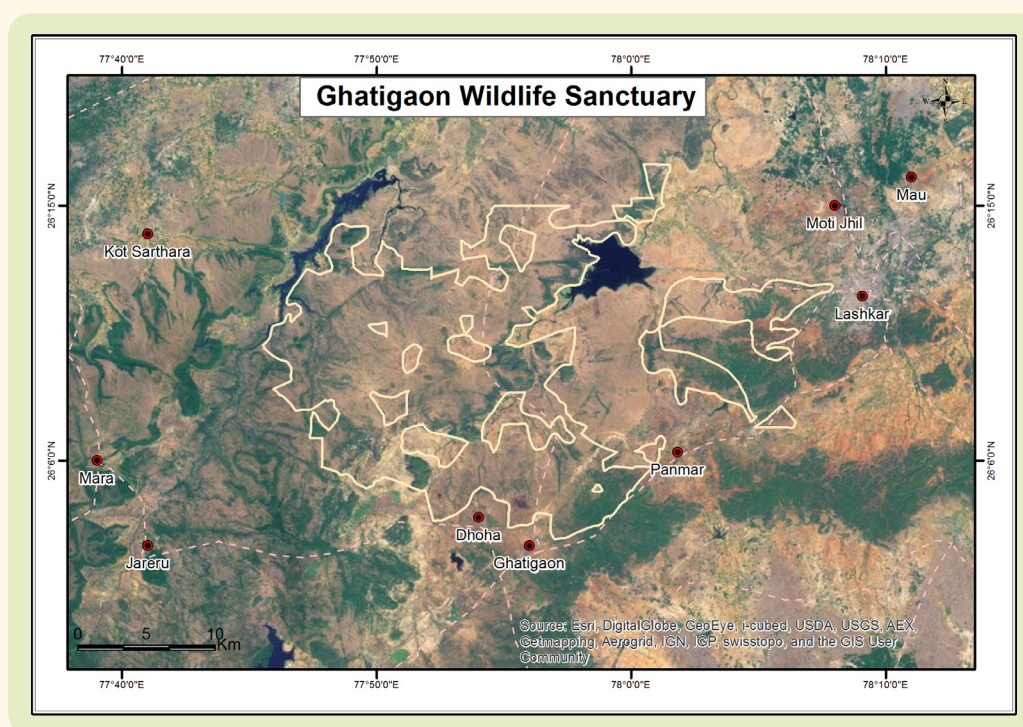
IN-MP-07

IBA Code	: IN-MP-07
Administrative Region (State)	: Madhya Pradesh
District	: Gwalior
Coordinates	: 26° 01' 38" N, 77° 51' 40" E
Ownership	: State
Area	: 51,100 ha

Altitude	: Not available
Rainfall	: 750 mm
Temperature	: 4 °C to 45 °C
Biogeographic Zone	: Semi-arid
Habitats	: Tropical Dry Deciduous Forest, Tropical Arid Zone

IBA CRITERIA: A1 (Threatened species)

PROTECTION STATUS: Wildlife Sanctuary, established in 1981.



GENERAL DESCRIPTION

Ghatigaon Bustard Sanctuary in Gwalior district was established specially to protect the Great Indian Bustard *Ardeotis nigriceps*, but the habitat selected (thick dry deciduous forest and hilly, undulating terrain) was not suitable for this species which prefers plains with short grasses. Eight to ten bustards were seen in a flat area near Ghatigaon village. However, the most important area, Tigra, was not included in the sanctuary. During the last 10 years, Tigra area has been completely occupied by humans, resulting in total extinction of the GIB. Therefore, this IBA is being placed in the category IBAs in Danger, as the trigger species is locally extinct. However, we are not removing it from the National IBA list in the hope that in future with better habitat management and conservation breeding, the Great Indian Bustard will be reintroduced here.

Ghatigaon Bustard Sanctuary is located c. 20 km from Gwalior, off the Agra-Mumbai National Highway NH-3. The sanctuary gets its name from Ghatigaon village, where its headquarters are located.

The vegetation comprises Mixed Dry Deciduous Forest, with *Anogeissus*, *Acacia*, *Ziziphus*, and *Butea* as the dominant genera.

AVIFAUNA

In the early 1980s, 15 to 18 Great Indian Bustard were found in Ghatigaon Sanctuary (Rahmani & Manakadan 1988). They were mainly seen in Kalitalai (near Ghatigaon village) and the Tigra Dam area near Gwalior. However, the population is now extinct.

There is no data on the other birdlife of this Sanctuary.



Great Indian Bustard has become extinct in Ghatigaon Bustard Sanctuary due to the mismanagement of its habitat, overgrazing and poaching. Has the trigger species has disappeared we consider this IBA as IBA in Danger

ENDANGERED

Great Indian Bustard (locally extinct) *Ardeotis nigriceps*

OTHER KEY FAUNA

Ghatigaon is a large sanctuary, generally forested and suitable for species such as Sambar *Rucervus unicolor*, Cheetal *Axis axis*, Nilgai or Blue Bull *Boselaphus tragocamelus*, and Chinkara *Gazella bennettii*. Blackbuck *Antelope cervicapra* is found in flat areas such as Kalitalai. Wolf *Canis lupus*, Golden Jackal *Canis aureus* and Indian Fox *Vulpes bengalensis* are found in the area. Leopard *Panthera pardus* and Striped Hyaena *Hyaena hyaena* are the larger predators.

LAND USE

- Nature education

THREATS AND CONSERVATION ISSUES

- Mismanagement of habitat
- Lack of interest on the part of Government
- Overgrazing during the bustard breeding season
- Expansion of human habitation

Despite its proximity to Gwalior Forest Division, Ghatigaon Bustard Sanctuary was totally neglected, with practically no concern for the fate of the remnant Great

Indian Bustard population. During intensive studies on this species in Karera (Rahmani 1989, Rahmani & Manakadan 1988), specific management plans were made to protect the habitat of the bustard. The recommendations were personally discussed with forest officials many times, sometimes in the field. However, no action was taken by the concerned authorities to maintain the grassland habitat in Kalitalai near Ghatigaon, where bustards were regularly found.

BNHS recommended the addition of the vast open areas near Tigra Dam, where the bustard used to breed, to the sanctuary. However, no attempts were made to take these initiatives, and it is now too late. There is a proposal to expand Gwalior city towards the Tigra Dam site, and as a consequence the last bustard habitat will be lost forever.

KEY CONTRIBUTOR

Asad R. Rahmani.

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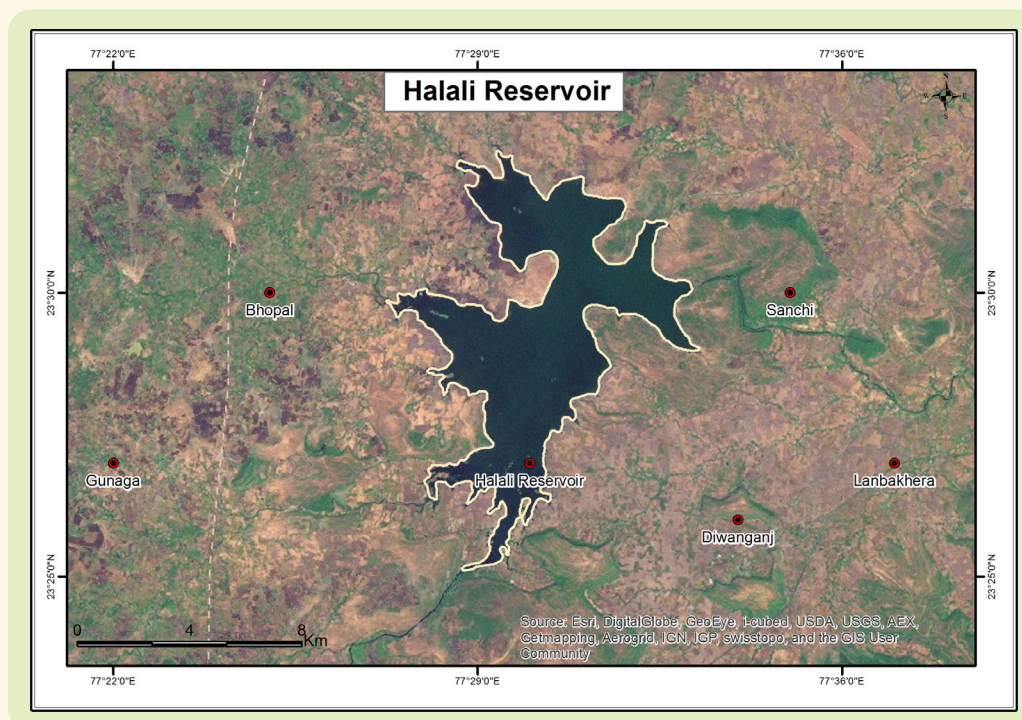
HALALI RESERVOIR

IBA Code	: IN-MP-08	Area	: 5,600 ha
Administrative Region (State)	: Madhya Pradesh	Altitude	: 458 msl
District	: Bhopal, Raisen	Rainfall	: 1,800 mm
Coordinates	: 23° 30' 00" N, 77° 30' 00" E	Temperature	: 5 °C to 45 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Freshwater Reservoir

IN-MP-08

IBA CRITERIA: A1 (Threatened species), A4iii (≥20,000 waterbirds)

PROTECTION STATUS: Not protected, reservoir built in 1973.



GENERAL DESCRIPTION

Halali Reservoir is located c. 25 km from Bhopal, the capital of Madhya Pradesh state. The reservoir was created in 1973, when an earthen dam was constructed over the River Halali. Two more rivers, Chamari and Ferozi, feed this huge reservoir. The waterspread extends over 5,600 ha, and the catchment area is much bigger, 69,900 ha, mainly consisting of Dry Deciduous and Thorn Forests.

Mainly used for irrigation and fishery, the reservoir attracts a large number of birds during winter. It has vast shallow stretches of water on its western shore. Most of the birds are seen towards the shallow end. Towards the bund side, the forest attracts many terrestrial birds. Although no detailed study has been conducted on the avifauna of this wetland and its environs, some useful information was collected during the winter of 2001–2002.

AVIFAUNA

A total of 150 bird species have been listed, of which 80 are waterbirds and the remaining terrestrial species which are found in the nearby forest (Sangeeta Rajgir & M. Khalique, *pers. comm.* 2014). More than 20,000 migratory birds used to visit the reservoir during winter (Koustubh Sharma, *pers. comm.* 2003). The number appears to be similar in recent years.

The shallow shores of Halali Reservoir can be reached by travelling through meandering village paths, via Islamnagar, which is a famous picnic spot near Bhopal. The area surrounding the villages is often littered with carcasses of domestic cattle. The carcasses used to have White-rumped *Gyps bengalensis*, Long-billed *Gyps indicus*, and Egyptian *Neophron percnopterus* Vultures feasting on them, along with domestic dogs. Such scenes are not seen very often

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

VULNERABLE

Sarus Crane	<i>Grus antigone</i>
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NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephala</i>

seen now. Sometimes, Red-headed Vulture *Aegypius calvus* is also seen.

As a result of the slow recession of water during winter, good roosting and foraging sites emerge on the reservoir shores, which provide perfect foraging grounds for waterfowl and waders. The presence of an unidentified species of pelican and Sarus Crane *Grus antigone* in the area, along with massive congregations of over 20,000 birds, makes this site a contender for IBA status.

OTHER FAUNA

No information available.

LAND USE

- Irrigation
- Fisheries

THREATS AND CONSERVATION ISSUES

- Poaching and trapping
- Use of pesticides by farmers

The reservoir is under the control of the Irrigation Department of Madhya Pradesh. Changes are taking place in the cropping pattern, which could be detrimental to birds, as the farmers have now taken to using pesticides. Their increasing investment of money and other resources makes them less tolerant to crop damage by birds. The reservoir is being actively promoted as a site for intensive cage aquaculture, including suggestions that water-logged areas should be used for rearing fish seeds (Tamot *et al.* 2008).

Poaching, especially by rich and influential people, is another problem, which could be solved by enforcement of existing laws and patrolling by forest guards. Presently, there is no Forest Department staff in the area.

There is an urgent need for a study on the socio-economic and ecological importance of this wetland, to develop a long-term conservation strategy that would benefit farmers and birds alike. Bird ringing should be started to generate data and interest in this important waterfowl refuge.

Extensive use of pesticides in the surrounding agriculture fields is a cause for concern, as residual pesticides run into in the water and cause pollution. Water is pumped from the reservoir by heavy duty pumps that create noise and disturb the birds.

Conservation measures

1. Halali Reservoir is a famous picnic spot accessible to three surrounding districts: Bhopal, Vidisha, and Raisen, and also a well-known tourist halt for visitors to Sanchi, a World Heritage Site. A small unit of the Madhya Pradesh state tourism department runs recreational tourism activities such as water sports and boating at the site. This has reduced the problem of poaching and trapping, but boating creates a huge disturbance to birds.
2. Community awareness programme is being run by Bhopal Birds.
3. Local forest staff is available in nearby forest areas, which should be involved to prevent poaching of waterfowl.
4. Regulated ecotourism can be helpful for the socio-economic development of the local people, providing them livelihood opportunities.

KEY CONTRIBUTORS

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KANHA NATIONAL PARK

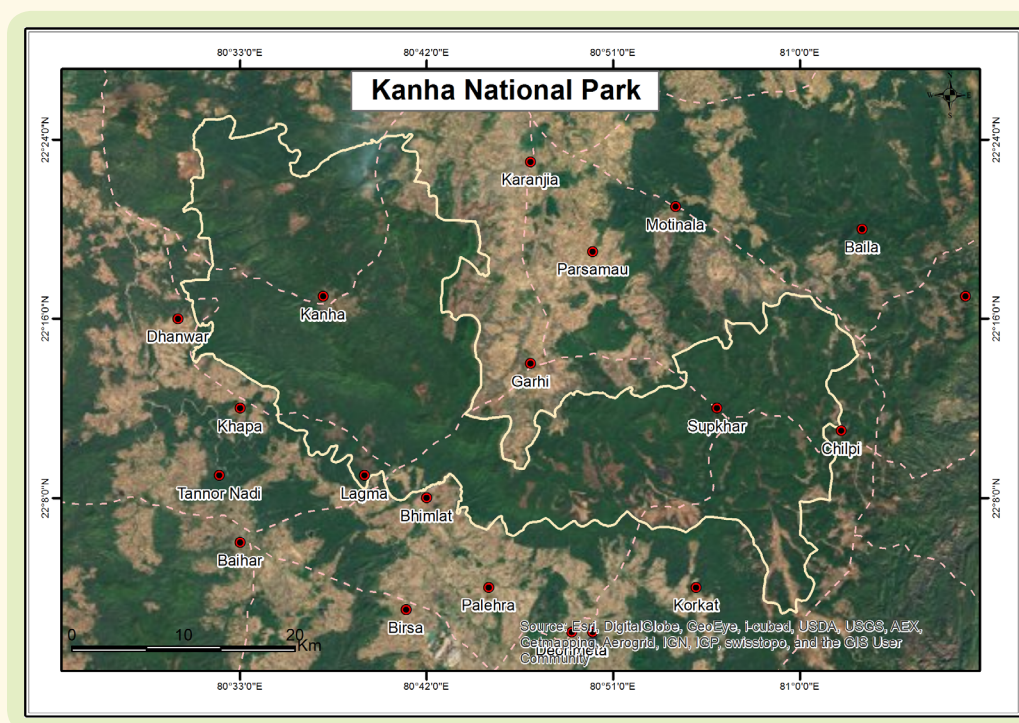
IBA Code	: IN-MP-09
Administrative Region (State)	: Madhya Pradesh
District	: Mandla, Balaghat
Coordinates	: 22° 20' 08" N, 80° 53' 09" E
Ownership	: State
Area	: 91,700 ha (core), 11,340 ha (buffer)

Altitude	: 600–900 msl
Rainfall	: 1,520 mm
Temperature	: 2 °C to 43 °C
Biogeographic Zone	: Deccan Peninsula
Habitats	: Tropical Moist Deciduous Forest, Tropical Dry Deciduous Forest, Tropical Grassland

IN-MP-09

IBA CRITERIA: A1 (Threatened species)

PROTECTION STATUS: Kanha National Park established on June 1, 1955. Together with a buffer zone of 1,134 sq. km and the neighbouring 110 sq. km Phen Sanctuary, it forms the Kanha Tiger Reserve. Present core area is 917 sq. km.



GENERAL DESCRIPTION

Kanha National Park in the central Indian highlands is well known as a world-class natural heritage site due to its large mammals, but not many people know that it is also an excellent birdwatching area. Located in the heart of Madhya Pradesh and stretching over an area of 940 sq. km, Kanha NP is part of Kanha Tiger Reserve, one of the largest tiger reserves in the world. The national park constitutes the core of Kanha Tiger Reserve. The buffer zone consists of 1,945 sq. km of Tropical Moist Deciduous Forest and grassland. We have considered Kanha NP as an IBA.

A large area of protected forest exists just outside the buffer zone (in Mandla, Balaghat, and Seoni districts) which acts as a corridor between Kanha and Pench Tiger Reserves, forming an extensive green cover facilitating

the movement of animals, including birds. The area is occasionally fragmented by agricultural land and small hamlets.

Two river valleys are prominent features of the park's topography: the Banjar in the west and the Halon in the east, both tributaries of River Narmada.

Kanha is a comparatively well-studied area (Schaller 1967, Kurt 1973, Martin 1977, Newton 1984, Kotwal 1984, 1987, Panwar 1977) but information on birds was lacking till Newton *et al.* (1986) published a preliminary list. Since then, there have been many additions to their records.

Four principal vegetation types have been identified in Kanha: Moist Deciduous Forest, Dry Deciduous Forest, valley meadow and plateau meadow. The vegetation is chiefly made up of Sal and Bamboo forests, and grassland.

The vegetation has been described in detail by Jain & Sastry (1983), Kotwal (1984, 1987), and Kotwal & Parihar (1989).

AVIFAUNA

Two hundred and sixty bird species have been listed from this IBA site (Newton *et al.* 1986; D'Cunha 1998, 2003). The list has now gone up to 280 species (Eric D'Cunha, *pers. comm.* 2014). Besides the two Critically Endangered vulture species, White-rumped *Gyps bengalensis* and Long-billed *Gyps indicus*, the Red-headed Vulture (*Aegypius calvus*) is regularly seen in and around the park, mostly solitarily, sometimes in twos. Newton *et al.* (1986), during their visits to Kanha between 1980 and 1983, found the White-rumped Vulture to be common, “scavenging Tiger *Panthera tigris* and Dhole *Cuon alpinus* kills”. Now it has become extremely rare, like elsewhere in India. The Long-billed Vulture was always scarce, mainly due to lack of nesting cliffs, but now it has disappeared completely from Kanha.

The endangered Lesser Florican *Sypheotides indicus*, which was first recorded by Ranjitsinh (1983) in Kanha, is now often seen, mainly in summer months. Eric D'Cunha (*pers. comm.*, 2014) recorded a female on May 23, 1999 in exactly the same area where Ranjitsinh had seen it in 1983. Since then there have been many records. For example, two Lesser Florican were sighted in 2013 (Sangeeta Rajgir, *pers. comm.* 2014).

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
Lesser Florican	<i>Sypheotides indicus</i>

VULNERABLE

Lesser Adjutant	<i>Leptoptilos javanicus</i>
Asian Woollyneck	<i>Ciconia episcopus</i>
Sarus Crane	<i>Grus antigone</i>

NEAR THREATENED

Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Grey-headed Fish-eagle	<i>Ichthyophaga ichthyaeus</i>
Pallid Harrier	<i>Circus macrourus</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>
Malabar Pied Hornbill	<i>Anthraceroceros coronatus</i>

The Sarus Crane *Grus antigone* is found just outside the Park, in Khapa in the buffer zone (Newton *et al.* 1986). The last pair of Sarus Cranes disappeared from the park in 2008, but it still seen in the adjoining Balaghat district.

Sightings of Dark Grey Bushchat *Saxicola ferrea* and Golden-fronted Leaf-bird *Chloropsis aurifrons* have increased their known distribution range. Newton *et al.*



DHRITIMAN MUKHERJEE

Under the project tiger many forest areas have been excellently protected, helping many other forest species. Kanha National Park is one of the finest such examples



DHIRTIMAN MUKHERJEE

Kanha NP has one of the finest Sag forests in India

(1986) also recorded that the Rosy Minivet *Pericrocotus roseus* is not a sporadic winter visitor to central India, as recorded by Ali & Ripley (1987), but also breeds in this area, as they observed a bird with nest material in May.

The Malabar Pied Hornbill *Anthraceroceros coronatus*, mainly found in the Western Ghats, eastern India, and Sri Lanka (Grimmett *et al.* 1998), was found to be common in the Sulka Valley of Kanha (Newton *et al.* 1986).

The Rufous-bellied Eagle *Hieraetus kienerii* has been sighted a few times by different observers (Eric D'Cunha *in litt.* 2014). This is an unusual record as the species is mainly found in Western Ghats and north and north-east India (Rasmussen & Anderton 2012). Another new record is the Brown Wood-owl *Strix leptogrammica*. There have been several records in the recent past of this species in Kanha (Eric D'Cunha, *in litt.* 2014).

In central India, Kanha is one of the largest and best protected areas, with well preserved forests. Therefore, the birdlife is rich and varied. It has most of the representative species of Biome 11 (Indo-Malayan Tropical Dry Zone). Of the 59 Biome 11 species listed by BirdLife International (undated), 33 are found in Kanha. D'Cunha (2003) has recently reported Crimson Sunbird *Aethopyga siparaja*, which is fairly common in the Himalaya and northeast hills and comes down to winter in the adjacent plains (Grimmett *et al.* 1998). It was reported once by D'Abreu (1913) from

Balaghat district, so this is the second record from central India. As Kanha is regularly visited by good birdwatchers, several authentic sightings have been reported and Crimson Sunbird appears to be a regular winter visitor to central India.

The Satpuras which form the Central Indian Highlands are an important stopover for many winter migrants during their North South passage and return migration, but there are very few reserves (notified) and protected areas in these ranges. Fortunately, Kanha, being a Tiger Reserve, gets good protection.

OTHER KEY FAUNA

Kanha NP was originally established to protect the hard-ground Barasingha *Cervus duvauceli branderi*, which is presently restricted to the park (Panwar 1977). Today, there are about 500 individuals. Other mammals include Tiger *Panthera tigris*, Leopard *P. pardus*, Sloth Bear *Melursus ursinus*, Indian Wild Dog or Dhole *Cuon alpinus*, and all other large and small mammals typically seen in central Indian forests. Hispid Hare *Caprolagus hispidus* has also been reported from the Kanha meadows, but has not been confirmed by sighting (Bell *et al.* 1990; Goutam Narayan, *pers. comm.* 2002).

Recently, the Indian Giant Flying Squirrel *Petaurista philippensis* and Mouse Deer or Indian Spotted Chevrotain

Moschiola indica were reported (Sangeeta Rajgir, *pers. comm.* 2014).

LAND USE

- Agriculture
- Tourism and recreation
- Nature conservation and research

THREATS AND CONSERVATION ISSUES

- Poaching in buffer zone
- Extensive tourism
- Grazing in buffer zone
- Human habitation
- Illegal felling of trees
- Collection of timber and firewood

Due to strict protection measures undertaken by the Project Tiger management, illicit felling, poaching, and encroachment are well prevented in the reserve. There is a proposal to link Phen WLS with Kanha Tiger Reserve. After an interim order from the Supreme Court and guidelines issued by the NTCA, tourism is now strictly regulated.

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MADHAV NATIONAL PARK

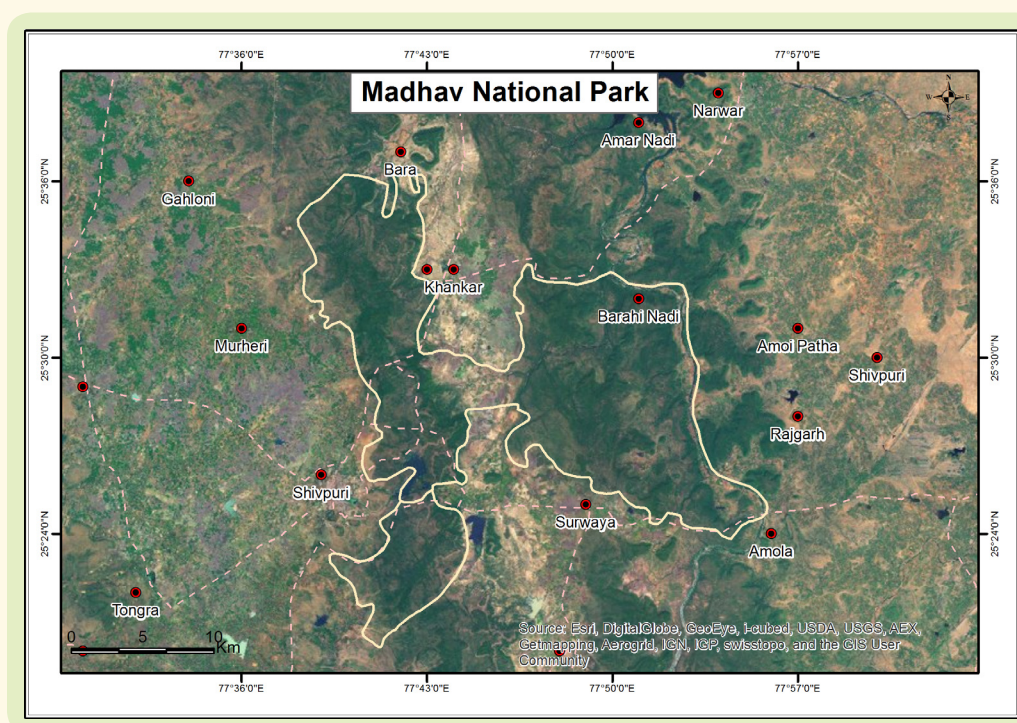
IBA Code	: IN-MP-10
Administrative Region (State)	: Madhya Pradesh
District	: Shivpuri
Coordinates	: 25° 28' 50" N, 77° 41' 26" E
Ownership	: State
Area	: 37,522 ha

Altitude	: 360–480 msl
Rainfall	: 800 mm
Temperature	: 3 °C to 47 °C
Biogeographic Zone	: Semi-arid
Habitats	: Tropical Dry Deciduous Forest, Freshwater Reservoirs

IN-MP-10

IBA CRITERIA: A1 (Threatened species), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: National Park, established January, 1958.



GENERAL DESCRIPTION

Madhav National Park was established in 1958 at the time of the creation of the state of Madhya Pradesh. It got its present name in 1959, when it was given final notification. The national park adjoins Shivpuri town, and is located c. 110 km south of the city of Gwalior. Two national highways, NH-8 Mumbai-Agra and NH-25 Shivpuri-Bhognipur, pass through the park, which also has a good network of motorable roads for tourists.

The park is interspersed with hills and valleys of the central Indian Vindhya hills. It is very popular amongst local tourists and visitors, but not as much among foreign tourists. It was the hunting preserve and summer resort of the former Maharaja of Gwalior. It is reported that in 1916, Lord Hardinge shot eight tigers in one day in the Shivpuri forests, and Lord Minto shot 19 tigers during his

trip to Gwalior State. These forests enjoyed a high degree of protection up to 1946.

In 1918, the Maharaja of Gwalior constructed dams on the Manihar river, creating the Sakhya Sagar (300 ha) and Madhav Lake (49 ha). With their scenic beauty and complete infrastructure for wildlife conservation, these reservoirs now attract thousands of waterfowl.

The forests of the site are typically Mixed Dry Deciduous. Important tree species are *Anogeissus pendula*, *Boswellia serrata*, and *Acacia catechuoides*.

AVIFAUNA

During a study by the BNHS, 227 birds were identified from this park. The lakes attract thousands of ducks and other waterbirds, sometimes numbering more than 20,000 (A4iii criteria). During the drought years of 1987–88, when



Madhav NP is trysected by Shivpuri-Gwalior, Shivpuri-Jhansi roads. Both are National Highways and have been upgraded recently

other waterbodies were dry, not less than 25,000 birds were found on Sakhya Sagar reservoir. Besides waterfowl, two species of migratory cranes are also seen: Demoiselle Crane *Grus virgo* and Common Crane *Grus grus*, their number varying from year to year.

During BNHS bird ringing camps between 1987 and 1992, 979 birds of 115 species were ringed (Hussain 1998). Madhav NP is also rich in birdlife typical of Dry Deciduous Tropical Forest. BirdLife International (undated) has listed 59 from Biome 11 (Indo-Malayan Tropical Dry Zone), of which 30 species have been listed by Hussain (1998).

A pair of Black-necked Stork *Ephippiorhynchus asiaticus* was regularly seen but no nest could be found. The vultures that used to be extremely common in and around Madhav NP have almost disappeared, with occasional sightings of Red-headed Vulture *Aegypius calvus* and Egyptian Vulture *Neophron percnopterus*. The *Gyps* species that used rest near the lake after feeding on ungulate carcasses, or soaring in the sky, are not seen any more.

OTHER KEY FAUNA

Madhav National Park has a long history of protection, as mentioned above. However, wild Tiger *Panthera tigris* disappeared as a resident animal in 1970, although occasional individuals were sighted much later. Since 2007, one male and one female are often seen. The major carnivores are Leopard *Panthera pardus*, Striped Hyaena *Hyaena hyaena*, Golden Jackal *Canis aureus*, and Jungle Cat *Felis chaus*. Cheetal *Axis axis*, Sambar *Rucervus unicolor*, Nilgai *Boselaphus tragocamelus*, Four-horned Antelope *Tetracerus quadricornis*, Gazelle *Gazella bennettii*, and Wild Boar *Sus scrofa* are the major ungulates. Sloth Bear *Melursus ursinus* is reported, but rarely seen. Northern Plains Langur *Semnopithecus entellus* is abundant, and the waterbodies are inhabited by Marsh Crocodile *Crocodylus palustris*.

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
Black-bellied Tern	<i>Sterna acuticauda</i>

VULNERABLE

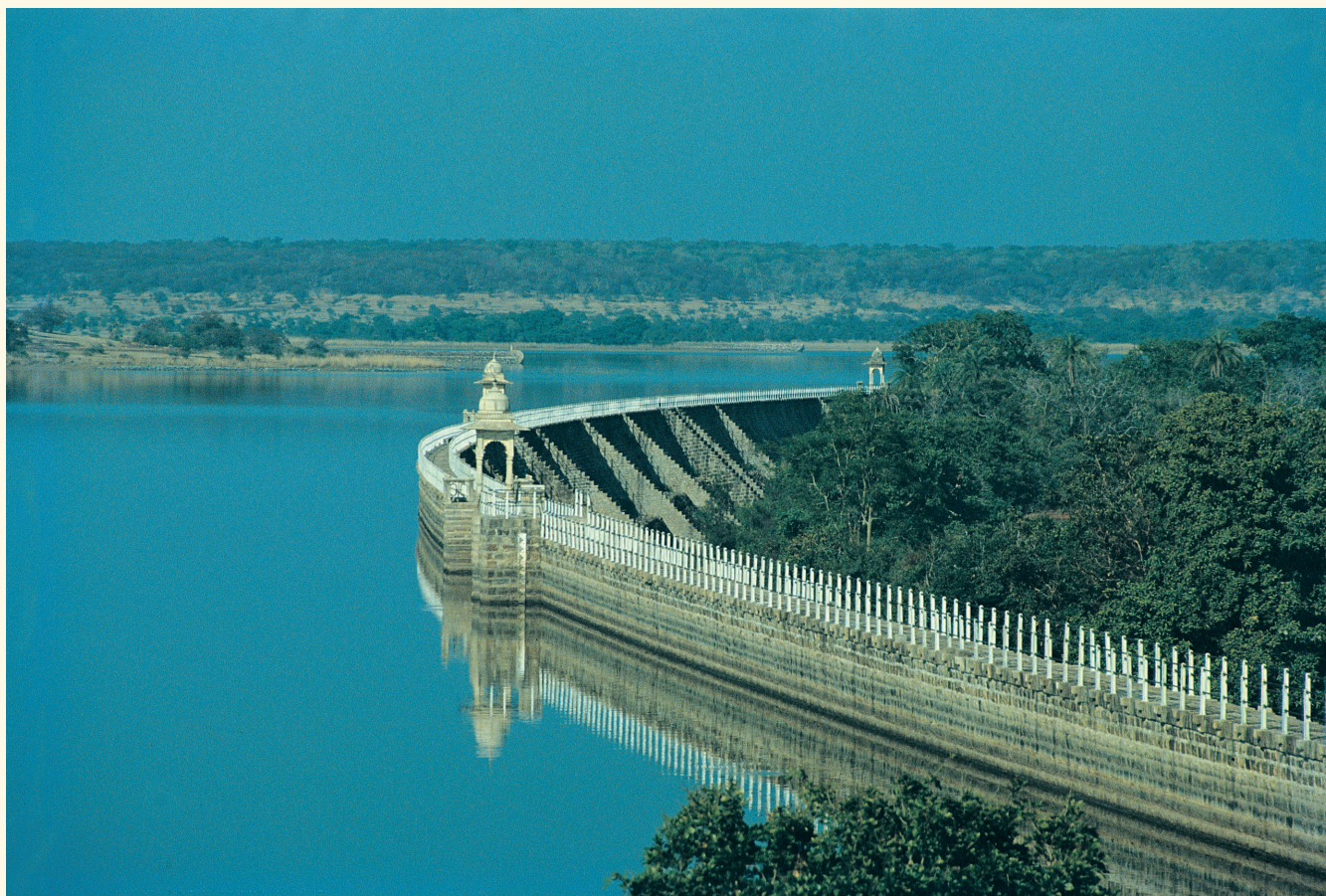
Lesser Adjutant	<i>Leptoptilos javanicus</i>
Asian Woollyneck	<i>Ciconia episcopus</i>
Great Spotted-eagle	<i>Clanga clanga</i>
Eastern Imperial-eagle	<i>Aquila heliaca</i>
Indian Skimmer	<i>Rynchops albicollis</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Red-headed Falcon	<i>Falco chicquera</i>
Laggar Falcon	<i>Falco jugger</i>
Pallid Harrier	<i>Circus macrourus</i>
Eurasian Curlew	<i>Numenius arquata</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna auratia</i>
Great Thick-knee	<i>Esacus recurvirostris</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

Red-napped Ibis	<i>Pseudibis papillosa</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
White-eyed Buzzard	<i>Butastur teesa</i>
Jungle Bush-quail	<i>Perdica asiatica</i>
Painted Spurfowl	<i>Gallus lunulata</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyrocus birostris</i>
Brown-headed Barbet	<i>Megalaima zeylanicus</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix griseus</i>
Rufous-winged Lark	<i>Mirafra assamica</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
White-bellied Minivet	<i>Pericrocotus erythropygius</i>
Indian Robin	<i>Saxicoloides fulicata</i>
Large Grey Babbler	<i>Turdoides malcolmi</i>
Jungle Babbler	<i>Turdoides striatus</i>
Ashy Prinia	<i>Prinia socialis</i>
Jungle Prinia	<i>Prinia sylvatica</i>
White-browed Fantail	<i>Rhipidura aureola</i>
Chestnut-tailed Starling	<i>Sturnus malabaricus</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>



ASAD R. RAHMANI

Dams at Madhav NP built by Maharaja of Gwalior attract thousands of waterbirds

LAND USE

- Tourism and recreation
- Nature conservation and research
- Forestry activities

THREATS AND CONSERVATION ISSUES

- Tourism
- National Highways NH-8 and NH-25 pass through the park
- Illicit felling, encroachment, and mining
- Poaching
- Collection of firewood
- Grazing

Livestock grazing is the biggest problem in Madhav NP. Although the park is enclosed by a wall, it is breached in many places to let in cows. The villagers also abandon their cattle when they stop giving milk, so herds of semi-feral animals can be seen. Till now, only half-hearted attempts have been made to solve this long-term problem.

As the park is surrounded by agricultural fields, the wild animals go out in the night to graze, and many get shot and killed. However, inside the park poaching is under control.

In the late 1980s, misguided attempts were made to bring back the tiger to the park, and millions of rupees were spent to put up a Tiger Safari in the core area. Fortunately, after refusal by the Central Zoo Authority, this so-called tiger safari is now being dismantled. With improvement of the habitat, a pair of tigers has become resident.

In the extension area of the park, stone mines have been closed, which has resulted in the revival of the flora and fauna. However, cattle grazing is still a problem which needs to be tackled.

The biggest threat to the park is from the expansion of the Agra-Mumbai NH-8 into an eight-lane national highway.

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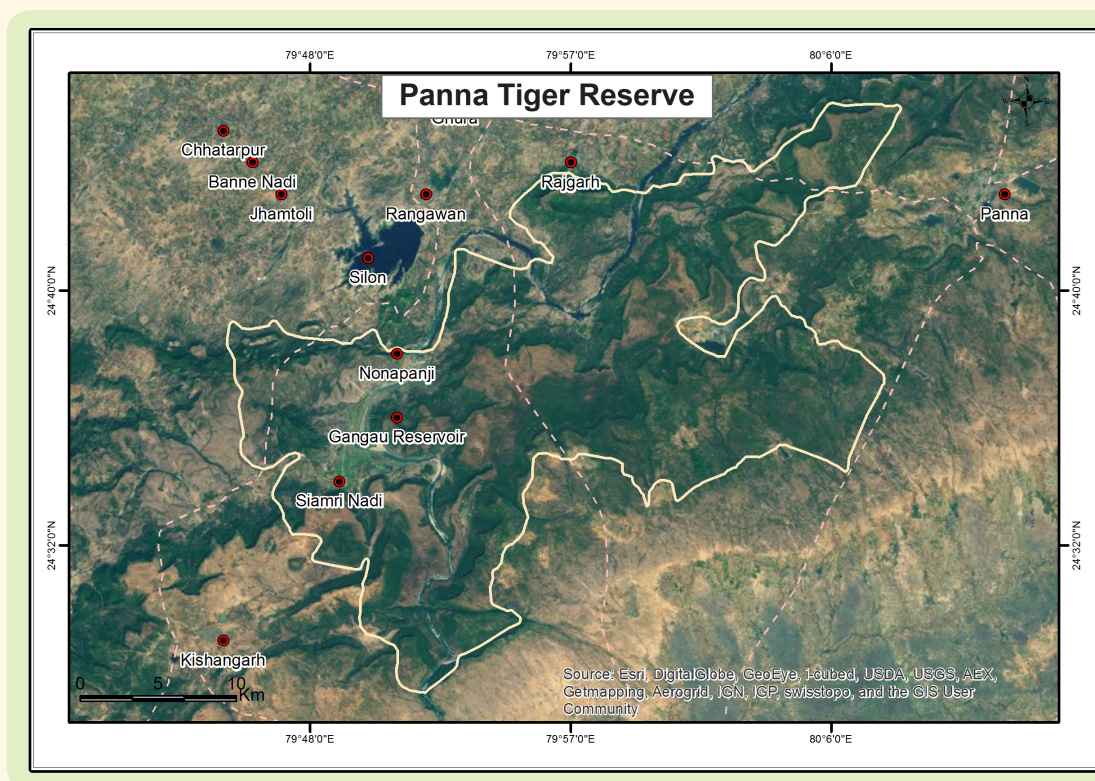
PANNA TIGER RESERVE

IN-MP-11

IBA Code	: IN-MP-11	Ownership	: State, Village Councils
State	: Madhya Pradesh	Altitude	: 200–550 msl
District	: Panna, Chhattarpur, Damoh	Rainfall	: 1,100 mm
Coordinates	: 24° 89' N, 80° 27' E, 24° 52' N, 79° 68' E	Temperature	: 5 °C to 48 °C
Area	: 1,645.08 sq. km (core area: 542.66 sq. km, buffer zone: 1,002.42 sq. km; Ken Gharial Sanctuary: 78.53 sq. km; Panna (Gangau) Sanctuary: 45.20 sq. km)	Biogeographic Zone	: Deccan Peninsula
		Habitats	: Tropical Dry Deciduous Mixed Forest, Teak forests, Kardhai <i>Anogeissus pendula</i> forests, Savannah

IBA CRITERIA : A1 (Threatened species)

PROTECTION STATUS : National Park, declared in 1981; Tiger Reserve, declared in 1994; Buffer zone created in 2013.



GENERAL DESCRIPTION

Panna Tiger Reserve is located in the north-central part of Madhya Pradesh. The reserve is situated in the western ranges of the Vindhya Hills and spreads over three administrative districts, Panna, Chhattarpur, and Damoh. The reserve can be reached from Khajuraho town (the nearest railhead and airport), 25 km away, and from Satna town, an important railway junction, 100 km away. Tourism is well developed in the region and tourists, both culturally inclined and nature oriented, visit the many attractions in the area.

The forests of Panna were once the shooting reserves of

the princely states of Bijawar (present-day Chhindwara), Chhattarpur, and Panna. Some dilapidated remnants of that bygone era are still found in the tiger reserve and the adjoining forests. The terrain of the tiger reserve is highly scenic, with plateau-topped steep hills, and deep wooded gorges. The recently declared buffer zone has large stretches of multiple-use grasslands. There are no villages in the core area of Panna TR, but 68 villages are located inside the buffer zone. Thousands of local people depend on the forests and enter them every day to access resources that are vital for their subsistence. Fuel wood collection and livestock grazing are the two main activities of the



SUNAL ROAMIN

When tiger became extinct in Panna in 2008 due to poaching, the Government of India and the State rightly took all measures to reintroduce this magnificent animal. However, the same governments were not bothered when the Great Indian Bustard became extinct in two sanctuaries which were created for this bird

local people. This anthropogenic pressure on Panna is an unavoidable reality, and also influences wildlife in the region (Kolipaka 2015).

Ken River, a major tributary of River Yamuna, originates in Katni district south of Panna Tiger Reserve. The river is the prime source of water for drinking and irrigation in the region. Several small and large reservoirs exist all along the Ken river (from its source till it enters the Yamuna in the north). These reservoirs are also important habitats for wetland birds and attract many winter migrants. A proposal

to build a large dam on Ken river at Gangau and to divert waters via a canal to the Betwa river, located 250 km west of Panna, is proposed by the government. If commissioned, such a dam would submerge more than 100 sq. km of the core area of the tiger reserve.

Although predominantly an open forest, Panna supports varied vegetation types: closed canopy forested areas, which occur mostly along the escarpments, stream beds, and less disturbed areas; open forests with short grass and shrub understorey; open savannah woodlands on the plateaus; tall grasslands that grow in relocated village sites and degraded scrub, largely towards the south and the periphery (Yoganand 2001).

Panna Tiger Reserve is mostly owned by the State, but village lands located in the buffer zone belong to the villages. Land use varies from inviolate forest patches prohibited for human use (core zone) to multiple-use areas in the buffer zone.

Ken river and many rainfed streams are the main source of water for wildlife. Large man-made reservoirs surround the national park.

AVIFAUNA

The first checklist of the birds of Panna Tiger Reserve

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Lesser Adjutant	<i>Leptoptilos javanicus</i>
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NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Ferruginous Duck	<i>Aythya nyroca</i>

prepared by the Wildlife Institute of India (Gogate *et al.* 2002) lists 228 bird species, and over the years birdwatchers have added at least 90 more species, taking it up to 312 at present (Koustubh Sharma & Shukru Kumal, *pers. comm.* 2015). Parts of the newly created buffer zone were surveyed for avifauna as part of a study on carnivores in 2014 (Kolipaka S. Shekhar, *pers. comm.* 2014) and resulted in a count of 126 species, with one new record for the area: White-tailed Lapwing *Vanellus leucurus*.

The forests of Panna are perhaps the most contiguous and most extensive forest remaining in north-central Madhya Pradesh in the Bundelkhand area. As Panna is located at the junction of the Deccan and the Indo-Gangetic Plains, multiple ecotones are characteristic of the region. Panna's unique geographic location, diverse vegetation types, and varying terrain support not only a large diversity of resident and migratory birds but also diverse terrestrial mammals too. With nearly 310 species of birds, Panna Tiger Reserve hosts almost all the species assemblages representative of Northern Vindhya region, thus justifying its selection as an IBA.

Another unique feature of Panna Tiger Reserve, and justification for its selection as an IBA, is the suitability of this site to support nesting of threatened vulture species. Eight species of vultures are recorded in Panna Tiger Reserve, of which four species breed in the reserve area. The species that nest and raise chicks in Panna include three Critically Endangered vulture species, Long-billed Vulture *Gyps indicus*, Red-headed Vulture *Aegypius calvus*, and the White-rumped Vulture *Gyps bengalensis*, and one Endangered species, the Egyptian Vulture *Neophron percnopterus*.

During the 2015 Vulture Census at Panna Tiger Reserve, 392 active nests with 354 chicks and three unhatched eggs were recorded at 30 permanent nesting locations. Over 2,000 vultures (including juveniles) of eight species were counted during a three-day Vulture Census (Panna Tiger Reserve, 2015). Forty Shaheen Falcon *Falco peregrinus peregrinator* were also recorded during the census. They breed in the tiger reserve.

OTHER KEY FAUNA

Among the large predators, Tiger *Panthera tigris*, Leopard *Panthera pardus*, Dhole or Wild Dog *Cuon alpinus*, Grey Wolf *Canis lupus pallipes*, Sloth Bear *Melursus ursinus*, and domestic dogs *Canis familiaris* are active, both in the core and buffer zones of Panna Tiger Reserve. Herbivorous animals include Chinkara *Gazella bennettii*, Four-horned Antelope *Tetracerus quadricornis*, Nilgai *Boselaphus tragocamelus*, Chital *Axis axis*, and Sambar *Rusa unicolor*. A small Blackbuck *Antelope cervicapra* population is found in the agricultural landscape outside the periphery of the reserve. Domestic cattle, especially feral cows and free roaming cattle, commonly occur in the reserve area.

LAND USE

- Tourism and recreation
- Nature conservation
- Pilgrimage to local religious sites (with special visitation rights, access is permitted to local people only)
- Multiple use of buffer zone for subsistence by local people

THREATS AND CONSERVATION ISSUES

- Proposed construction of a new dam inside the reserve
- Human-wildlife conflict
- Conflict within stakeholder groups over access to resources and conflicting interests
- Seasonal forest fires (mostly as a result of human human conflict)
- Unregulated livestock grazing and free roaming feral cattle in the reserve area
- Illicit wood cutting, poaching by local elite and villagers, and illegal cattle grazing in the core area
- Illegal fishing and trapping of otters along the Ken river
- Unchecked use of traps and snares by traditional hunting tribes that threaten all wide ranging species
- Unchecked collection of firewood to meet energy demands of faraway towns and villages

The major conservation issues for Panna Tiger Reserve currently are the management of multiple use buffer zones, creation of wildlife corridors, and building the capacity of the staff to work alongside local people.

The Park has a special place in north-central Madhya Pradesh from the point of view of ecology, vegetation, and culture, and is a true representative of the Bundelkhand region. There are also valuable management lessons to be learnt from Panna Tiger Reserve in both wildlife management and local stakeholder management.

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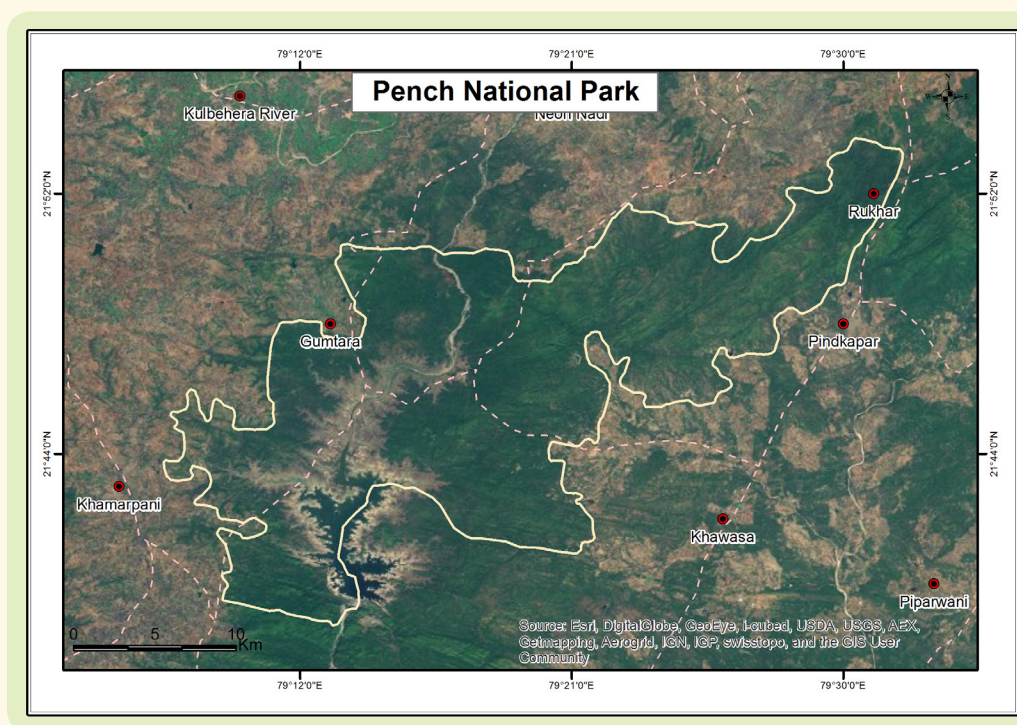
PENCH TIGER RESERVE

IBA Code	: IN-MP-12	Area	: 29,285 ha
Administrative Region (State)	: Madhya Pradesh, Maharashtra	Altitude	: 580–675 msl
District	: Seoni, Chhindwara	Rainfall	: 1,397 mm
Coordinates	: 21° 50' 42" N, 79° 27' 47" E	Temperature	: 3 °C to 47 °C
Ownership	: State	Biogeographic Zone	: Deccan Peninsula
		Habitats	: Tropical Dry Deciduous Forest

IN-MP-12

IBA CRITERIA: A1 (Threatened species), A3 (Biome-restricted species)

PROTECTION STATUS: Tiger Reserve, established 1975.



GENERAL DESCRIPTION

Pench Tiger Reserve is named after the Pench river which flows north to south through the reserve. The reserve is located in the southern reaches of the Satpura Hills in Seoni and Chhindwara districts in Madhya Pradesh, and continues into Nagpur district in Maharashtra as another sanctuary. The terrain is undulating, with most of the area covered by small hills and steep slopes.

Pench is located in an area of Central India that holds a significant place in the natural history of India. The description of its richness in fauna and flora and its natural beauty has been recorded in numerous books dating back to the 17th century.

Pench Tiger Reserve of Madhya Pradesh adjoins Pench Wildlife Sanctuary of Maharashtra (both considered separate IBAs for administrative reasons). Pench Tiger

Reserve was created in 1992, becoming the 19th reserve in the Project Tiger network (Jain 2001). The core zone of the reserve, Pench National Park, was created in 1983. This was carved out of the 44,939 ha Pench Sanctuary created in 1977. The area of the national park is 29,285 ha, which is divided almost equally among two districts: 14,536 ha in Seoni and 14,728 ha in Chhindwara.

The area is criss-crossed by numerous seasonal streams and nullahs. Pench river, which flows through the centre of the reserve, runs dry by the end of April, but a number of pools, locally known as *dohs*, remain which serve as waterholes for the wildlife. A few perennial springs also exist in this area. Pench Reservoir, located at the centre of the reserve, is the only major water source during the summer.

One village is situated within the reserve and nine are located on its periphery. The core area lies c. 7 km from the

Nagpur-Jabalpur National Highway. The proximity of the reserve to Nagpur city attracts several tourists to the area. On an average, 100,000 tourists visit this area every year.

The main forest type of Pench Tiger Reserve is Southern Tropical Dry Deciduous Forest. The understorey includes *Emblica officinalis*, *Acacia catechuoides*, and *Chloroxylon swietenia*. Bamboo *Dendrocalamus strictus* occurs sparsely, and is restricted to some valleys. There are almost pure patches of *Clietanthus collinus* and *Terminalia alata* at several places. Thick stands of Lantana can be seen in areas with low-density forests near human habitation (Dwivedi 2003).

AVIFAUNA

A total of 262 species of birds have been identified from this IBA site between February 1996 and July 2000 (Pasha *et al.* 2004). This paper added 84 species to the previous checklist (Kumar 1999). In a week-long bird survey conducted in November 2012 by BNHS, 122 species of birds were sighted (Raju Kasambe, *pers. comm.* 2014). But the Critically Endangered Forest Owlet *Heteroglaux blewitti* was not found during this survey. Black Stork *Ciconia nigra*, River Lapwing *Vanellus duvaucelii*, Malabar Pied Hornbill *Anthraceroceros coronatus*, Grey-headed Fish-eagle *Ichthyophaga ichthyaeus*, Alexandrine Parakeet *Psittacula eupatria*, River Tern *Sterna aurantia*, and Forest Wagtail *Dendronanthus indicus* were sighted during this survey.

Pench Reservoir, spread over 5,000 ha, is a major attraction to migratory waterfowl, and the dead trees scattered amidst the reservoir are good nesting sites for cormorants, egrets, herons, and storks. Asian Woollyneck *Ciconia episcopus*, Painted Stork *Mycteria leucocephala*, Asian Openbill *Anastomus oscitans*, Black-headed Ibis *Threskiornis melanocephalus*, and Purple Heron *Ardea purpurea* are some of the birds that breed around the reservoir. As the reservoir is bordered by forest and does not have low-lying shallow areas, small waders are not common.

Since fishing was totally prohibited, the number of waterfowl has increased dramatically, both as breeding and wintering birds. According to R.N. Saxena (*pers. comm.* 2003), more than 2,000 Little Cormorant *Phalacrocorax niger* were found nesting in 2001–2002.

Some interesting bird records by Pasha *et al.* (2004) are regular sightings of Pied Harrier *Circus melanoleucos* every year since 1996; up to 10 pairs of Malabar Pied Hornbill *Anthraceroceros coronatus*; and a male Rosy Minivet *Pericrocotus roseus*. This indicates that there is small resident population of Malabar Pied Hornbill in Pench, which was supposed to occur mainly in the Western Ghats and eastern India, while the Rosy Minivet is a bird of the Himalaya and northeast India, wintering mainly in northeast and eastern India (Grimmett *et al.* 2011). The presence of these two species in Pench indicates that they have a wider distribution than was known.

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
Saker Falcon	<i>Falco cherrug</i>

VULNERABLE

Asian Woollyneck	<i>Ciconia episcopus</i>
Greater Spotted-eagle	<i>Clanga clanga</i>
Eastern Imperial-eagle	<i>Aquila heliaca</i>
Green Munia	<i>Amandava formosa</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Grey-headed Fish-eagle	<i>Ichthyophaga ichthyaeus</i>
Cinereous Vulture	<i>Aegypius monachus</i>
River Lapwing	<i>Vanellus duvaucelii</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>
Malabar Pied Hornbill	<i>Anthraceroceros coronatus</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

Red-napped Ibis	<i>Pseudibis papillosa</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
White-eyed Buzzard	<i>Butastur teesa</i>
Painted Francolin	<i>Francolinus pictus</i>
Jungle Bush-quail	<i>Perdica asiatica</i>
Painted Spurfowl	<i>Galliperdix lunulata</i>
Indian Peafowl	<i>Pavo cristatus</i>
Indian Courser	<i>Cursorius coromandelicus</i>
Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>
Yellow-footed Green-pigeon	<i>Treron phoenicoptera</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyroceros birostris</i>
Yellow-crowned Woodpecker	<i>Dendrocopos mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
White-naped Woodpecker	<i>Chrysocolaptes festivus</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix griseus</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
White-browed Fantail	<i>Rhipidura aureola</i>
Indian Robin	<i>Saxicoloides fulicatus</i>
Jungle Babbler	<i>Turdoides striatus</i>
Ashy Prinia	<i>Prinia socialis</i>
Jungle Prinia	<i>Prinia sylvatica</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>
Brahminy Starling	<i>Sturnus pagodaru</i>
Chestnut-tailed Starling	<i>Sturnus malabaricus</i>

Besides the globally Threatened species found in this IBA, Pench TR has been selected as an IBA on the basis of A3 criteria (biome-restricted species). Pench has the typical forest type and bird assemblages of central India. BirdLife International (undated) identified 59 species in Biome 11. In Pench, 30 have been seen till now (Pasha *et al.* 2004; Raju Kasambe, *pers. comm.* 2014). Jayapal (1997) studied the bird communities-habitat structure relationships in this IBA for his PhD. dissertation.

OTHER KEY FAUNA

Pench has most of the mammals found in central Indian forests, such as the Tiger *Panthera tigris*, Leopard *P. pardus*, Sloth Bear *Melursus ursinus*, Indian Pangolin *Manis crassicaudata*, Cheetal *Axis axis*, Sambar *Rucervus unicolor*, Barking Deer *Muntiacus muntjak*, Blue Bull or Nilgai *Boselaphus tragocamelus*, Wild Boar *Sus scrofa*, and Gaur *Bos gaurus*. Jungle Cat *Felis chaus*, Leopard Cat *Prionailurus bengalensis*, Striped Hyaena *Hyaena hyaena*, Dhole *Cuon alpinus*, and Common Mongoose *Herpestes edwardsii* are the smaller carnivores. The Freshwater Crocodile *Crocodylus palustris* is found in the reservoir.

In a study conducted from November 1998 to April 1999 in an intensive study area of 61.1 sq. km, very high ungulate density (90.3 animals per sq. km) was recorded, with Cheetal *Axis axis* being the most common species (80.7 animals per sq. km), followed by Sambar *Rucervus unicolor* (6.1 animals per sq. km). Northern Plains Langur *Semnopithecus entellus* (77.2 animals per sq. km) was the most abundant primate species (Biswas & Sankar 2002). The ecology of Gaur *Bos gaurus* was studied by Sankar *et al.* (2000) and that of Dhole or Asiatic Wild Dog *Cuon alpinus* was studied by B.B. Acharya (2008) in this IBA.

LAND USE

- Agriculture
- Nature conservation and research
- Tourism and recreation
- Watershed management

KEY THREATS AND CONSERVATION ISSUES

- Grazing
- Illegal fishing
- Tourism
- Introduction of exotic species
- Collection of timber and firewood

There were two villages within the reserve, which have been relocated outside it in 1992. These have been

converted to good pasture for wild ungulates. *Butea monosperma*, *Lagerstroemia parvifolia*, and *Terminalia alata* have spread, along with weeds. These need to be controlled.

Tremendous disturbance was inflicted on the forests of the reserve during the construction of the Pench Dam at Totladoh. Since the ban on fishing in the reservoir, the birdlife has improved tremendously. However, illegal fishing continues.

Funds and infrastructure to manage Pench TR are scarce, and about 30% of the posts of forest guards are vacant. About 4,000 heads of livestock from the surrounding villages depend solely on the reserve for grazing. A similar number of villagers in and around the reserve are entirely dependent on it for firewood and small timber. There is also some encroachment by villagers from Ghatpendhri. A new road has been constructed through the reserve, which could increase the poaching problem.

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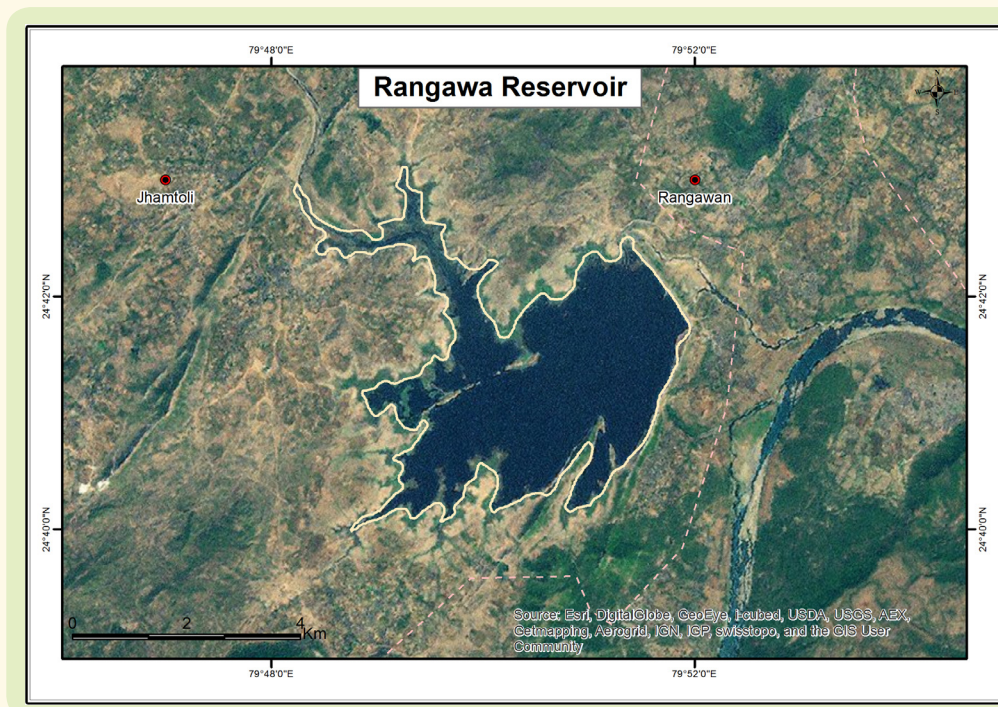
RANGAWA RESERVOIR

IN-MP-13

IBA Code	: IN-MP-13	Area	: 500 ha
Administrative Region (State)	: Madhya Pradesh	Altitude	: 257 m
District	: Chhattarpur	Rainfall	: 1,074 mm
Coordinates	: 24° 41' 60" N, 79° 50' 60" E	Temperature	: 4 °C to 48 °C
Ownership	: State	Biogeographic Zone	: Deccan Peninsula
		Habitats	: Freshwater Reservoir

IBA CRITERIA: A4iii (≥20,000 waterbirds), Data Deficient

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

Rangawa reservoir is located about 15 km from the airport of Khajuraho, a World Heritage Site. It is a vast reservoir of c. 500 ha. The wetland is surrounded by hillocks, villages and agricultural fields. The boundary of the Panna Tiger Reserve (an IBA) is located just a few hundred metres from the reservoir. The reservoir is easily accessible, being close to the national highway and village roads.

The Rangawa Rangawa reservoir was constructed by the Uttar Pradesh Government (completed in 1957) to provide irrigation to the Banda district of Uttar Pradesh. In 1972, the Government of Madhya Pradesh and Uttar Pradesh made an agreement for the distribution of water from the Rangawa reservoir between their states. As per the agreement, up until 31st October each year, Madhya Pradesh would use 2 T.M.C water from the reservoir. The available balance storage on 1st November would then be

divided between Uttar Pradesh and Madhya Pradesh, in the ratio of 36:15. Nearly 17,000 ha of land is irrigated through this dam and its associated canals (Anon. undated).

The vegetation around the reservoir comprises mostly thick Teak forest *Tectona grandis*, which covers almost the entire terrain towards the southeast of the reservoir. Apart from this, Palash or Dhak *Butea monosperma*, makes up the rest of the vegetative cover. Other hillocks around the reservoir bear small shrubs.

The main bund of the Dam is about 2 km long, and gives way to a canal which is used for irrigation. The Rangawa reservoir has long shallow stretches towards its northern and western peripheries, close to the Panna-Khajuraho road. This area supports most of the migratory birds during winter. As fishing and other conspicuous human activities are conducted towards the deeper zones, the birds get a relatively disturbance free refuge in the shallow areas.

AVIFAUNA

The precise number of species present in and around the lake is unknown. Reports suggest that the reservoir hosts more than 20,000 birds during peak winter season. Therefore, it satisfies A4iii criterion.

The reservoir is mainly used for irrigation and fishing. An old, partially submerged castle towards the southeast is used by Great Cormorant *Phalacrocorax carbo*, Little Cormorant *Phalacrocorax niger* and other birds for roosting. Many forest birds that are seen in Panna Tiger Reserve can be seen here, although no proper survey has ever been conducted.

LAND USE

- Agriculture
- Fishing

THREATS AND CONSERVATION ISSUES

- Soil erosion at the reservoirs banks

- Poaching
- Encroachment and intensive land use

The villages in the catchment area of Rangawa reservoir are primarily dependent on agriculture. Use of toxic pesticides is prevalent, and the farmers do not know the proper quantity of pesticides that they must use. As a result, large quantities of pesticides flow into the reservoir, the cumulative toxic effect needs to be studied.

KEY CONTRIBUTOR

Koustubh Sharma

KEY REFERENCE

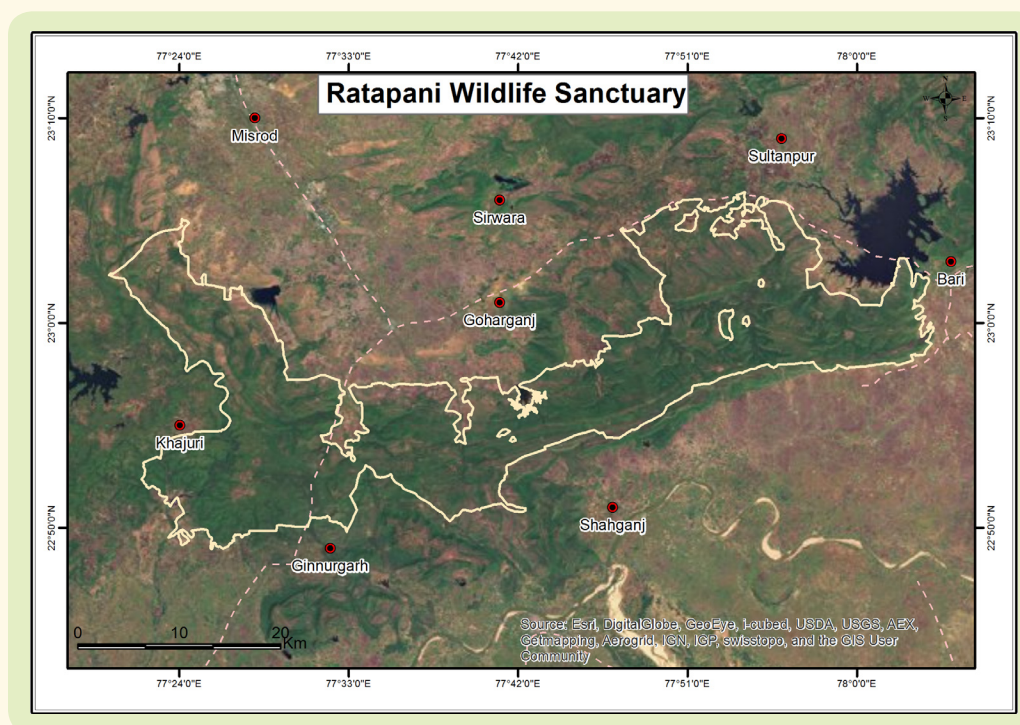
Anon. (undated) *Study on Issues Related to Gap between Irrigation Potential Created and Utilized*. Final Report. Submitted to Ministry of Water Resources Government of India, by Indian Institute of Management, Lucknow. Pp 257.

RATAPANI WILDLIFE SANCTUARY

IBA Code	: IN-MP-14	Altitude	: 300–690 msl
Administrative Region (State)	: Madhya Pradesh	Rainfall	: Not available
District	: Raisen, Sehore	Temperature	: 5 °C to 42 °C
Coordinates	: 23° 07' 13" N, 77° 52' 35" E	Biogeographic Zone	: Deccan Peninsula
Ownership	: State	Habitats	: Tropical Dry Deciduous Forest, Tropical Moist Deciduous Forest, Freshwater Reservoir
Area (ha)	: 82,384 ha		

IBA CRITERIA: A1 (Threatened species), A4iii ($\geq 20,000$ waterbirds), A3 (Biome-restricted species).

PROTECTION STATUS: Wildlife Sanctuary, established in 1976. Upgradation to Tiger Reserve approved in principle by central government in 2008. In March 2013, the National Tiger Conservation Authority (NTCA) approved a proposal to grant it official status of a tiger reserve but till now it has not been implemented.



GENERAL DESCRIPTION

Ratapani WLS is spread over a vast area in the forests of the Vindhya Range, north of the Narmada river. Bhopal, the state capital, is c. 35 km away. The landscape is undulating, with hills, plateaux, valleys, and plains. A number of seasonal streams irrigate the site in the monsoon, and water is retained in some pools along these streams even in summer. Two large reservoirs, namely Barna Reservoir and Ratapani Dam (Barrusot Lake) are among the major waterbodies adjacent to or inside the sanctuary. Ratapani WLS includes four ranges: Dahod, Delawari, Berkheda, and Bineka. Among these four ranges, Delawari is the most famous and important ecotourism destination (Sharma & Bhattacharya 2014).

The forest of Ratapani is Dry Deciduous and Moist Deciduous type, with Teak *Tectona grandis* as the main tree species, covering c. 55% of the area. The remaining mixed forests consist of various dry deciduous species. Bamboo *Dendrocalamus strictus* is common to the two aforementioned forest types and covers about one quarter of the forest area (Dwivedi 2003). It is claimed that Ratapani has the finest type of Teak in the state.

The world renowned Bhimbetka rock shelter are located within this tiger reserve. These caves were inhabited by humans thousands of years ago and some of the rock paintings of the Stone Age are more than 30,000 years old. Bhimbetka has been declared a World Heritage Site by UNESCO.

AVIFAUNA

Ratapani WLS is rich in the typical wildlife of central India. Not much work has been done on the birds of Ratapani, although frequent visits by birdwatchers to the site provide baseline information on the species seen in and around the site. The Management Plan contains a checklist of 112 bird species found in the sanctuary. More than 150 species of birds are reported from Ratapani Wildlife Sanctuary (K. Sharma, *pers. comm.* 2003).

White-rumped Vulture *Gyps bengalensis*, Long-billed Vulture *Gyps indicus*, and Red-headed Vulture *Aegypius calvus* used to be found perched in a cluster of trees or soaring at great heights in search of food (K. Sharma, *pers. comm.* 2002) but now they are rarely seen.

The Ratapani Dam along the periphery of the sanctuary invites thousands of migratory birds in winter. There are many smaller reservoirs dotted all over the sanctuary. The total waterfowl populations in all these smaller reservoirs and Ratapani Reservoir would easily exceed 20,000 (A4iii criteria). Moreover, these waterbodies also attract large wading birds such as Sarus Crane *Grus antigone*, Painted Stork *Mycteria leucocephala*, Black-necked Stork *Ephippiorhynchus asiaticus*, and Asian Woollyneck *Ciconia episcopus* (Koustubh Sharma, *pers. comm.* 2002). The rich diversity in terrestrial species throughout the sanctuary certainly calls for a proper bird survey of the area.

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Sarus Crane	<i>Grus antigone</i>
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NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Ferruginous Duck	<i>Aythya nyroca</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>
Malabar Pied Hornbill	<i>Anthracoceros coronatus</i>

Ratapani retains some of the finest representative forest cover of Biome 11 (Indo-Malayan Tropical Dry Zone). Of the 59 bird species identified by BirdLife International (undated) in this biome, 33 are found in Ratapani, further proving the importance of this site for the protection of biome species. Detailed studies could reveal more bird species. Recent sighting records of bird species in Ratapani include Indian Pitta *Pitta brachyura*, Asian Paradise Flycatcher *Terpsiphone paradisi*, Grey-bellied Cuckoo *Cacomantis passerinus*, Eurasian Blackbird *Turdus merula*, Osprey



Leopard is the most widely distributed big cats of India

Pandion haliaetus, Tawny Eagle *Aquila rapax*, Brown Fish-owl *Ketupa zeylonensis*, and Mottled Wood-owl *Strix ocellata* (Sangeeta Rajgir, pers. comm. 2014).

OTHER KEY FAUNA

This site has almost all the carnivores and herbivores found in dry deciduous forests of central India. The carnivores include the Tiger *Panthera tigris*, Leopard *P. pardus*, Dhole or Wild Dog *Cuon alpinus*, Striped Hyena *Hyaena hyaena*, Golden Jackal *Canis aureus*, and Jungle Cat *Felis chaus*. The herbivores include Cheetal *Axis axis*, Sambar *Cervus unicolor*, Nilgai *Boselaphus tragocamelus*, Four-horned Antelope *Tetracerus quadricornis*, and Wild Boar *Sus scrofa* (Dwivedi 2003). Not much is known about the smaller mammals, reptiles, and amphibians.

A detailed vegetation survey has been done by Sharma & Bhattacharya (2014) in Delawari Range. Some of the important species listed by them are *Buchanania latifolia*, *Emblia officinalis*, *Albizia odoratissima*, *Grewia tiliaefolia*, *Wrightia tinctoria*, *Ziziphus xylopyra*, *Chloroxylon swietenia*, *Anogeissus latifolia*, and *Pterocarpus marsupium*.

LAND USE

- Tourism and recreation
- Pilgrimage
- Transport
- Fishing
- Irrigation

THREATS AND CONSERVATION ISSUES

- Poaching
- Encroachment
- Illicit felling
- Livestock grazing
- Forest fires
- Man-animal conflict
- Infrastructure development
- Noise pollution
- Uncontrolled tourism

This large sanctuary faces pressures on all fronts. Illicit felling, grazing by cattle, poaching, and encroachment are

the major concerns for the management. The presence of 26 villages inside the sanctuary and another 109 villages around it exerts anthropogenic pressures. These villages are dependent for their day-to-day needs on the biomass resources of the sanctuary. Forest fires, natural and man-made, are a major problem in summer. The long, narrow area of Ratapani WLS (c. 70 km x 15 km) makes it more vulnerable to intensive biotic pressure in most of its areas.

The killings of domestic cattle by wild animals in Ratapani has gone up from four cattle in 2008, to 20 in 2009, and 37 in 2010 (Dwivedi 2003).

Sharma & Bhattacharya (2014) have listed the following pressures on the habitats and wildlife of Ratapani:

Tourism and recreational activities: Concentration of visitors in the forest area during peak season, and their activities. Disposal of litter including polythene in the forest area.

Forest Fires: Decline and loss of local species, particularly invertebrate fauna; Decline in habitat value and depletion of resources.

Infrastructure: Road, highway, construction within the area, scarcity of water, loss in natural resources of waterbodies.

Noise generation: Due to visitors' concentration in a specific area and transportation through the range. Picnicking activities.

KEY CONTRIBUTORS

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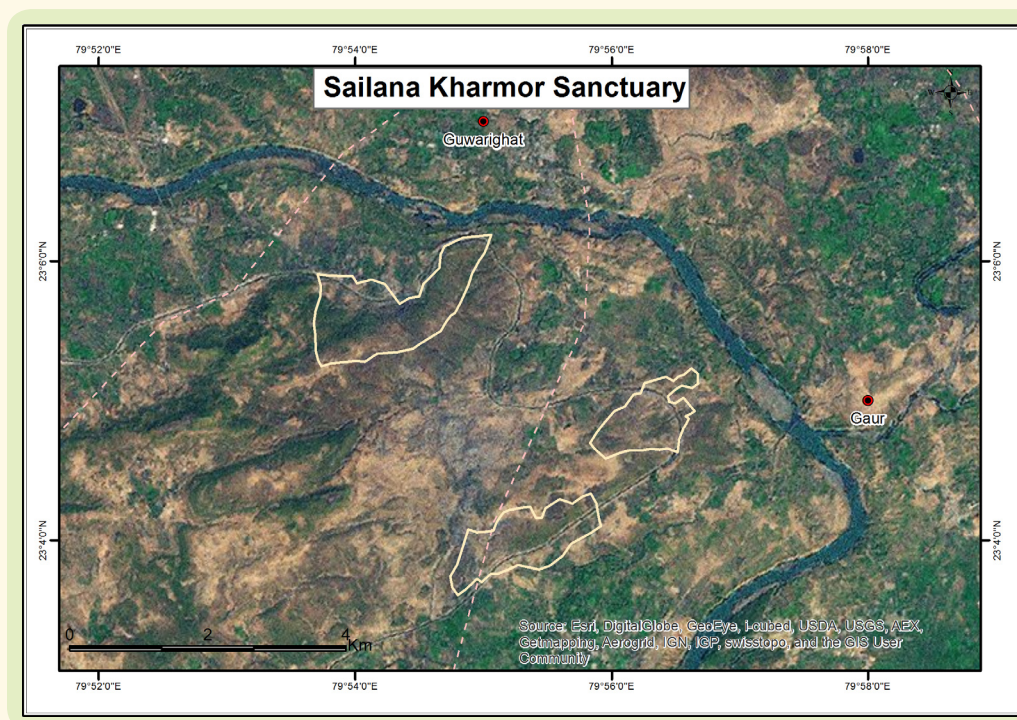
SAILANA KHARMOR SANCTUARY

IBA Code	: IN-MP-15	Area	: 1,296 ha
Administrative Region (State)	: Madhya Pradesh	Altitude	: 484 msl
District	: Ratlam	Rainfall	: 800 mm
Coordinates	: 23° 24' 26" N, 74° 58' 05" E	Temperature	: 10 °C to 43 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Tropical Grassland

IN-MP-15

IBA CRITERIA: A1 (Threatened species).

PROTECTION STATUS: Wildlife Sanctuary, established June, 1983.



GENERAL DESCRIPTION

The Sailana Kharmor Sanctuary was declared a protected area in June, 1983 to safeguard the Endangered Lesser Florican *Sypheotides indicus*, known locally as *Kharmor* (=Grass Peacock). It included 354 ha of grassland, crop fields, and grazing land. The sanctuary is bounded by three villages, Sailana, Adwanya, and Gordhanpura, and the whole area is jointly owned by agriculturists. The grassland area within the sanctuary is c. 200 ha and is known as *Naulakha beed* (Sankaran 1990). The grassland was maintained and protected primarily for fodder production.

Sailana Kharmor Sanctuary falls within the Malwa plateau, which extends over 34,600 sq. km and is a wide tableland with a mean elevation of c. 484 msl. It is a vast, undulating plateau, interspersed with a few small hills. This plateau was once apparently well wooded, with Teak *Tectona grandis* and Dhak *Butea monosperma*, but with the loss of

the original forest, pure grasslands were formed.

Most of the sanctuary area is treeless, dominated by *Sehima nervosum*-*Chrysopogon fulvus* grass type. Other grass species are *Heteropogon contortus*, *Apluda mutica*, *Cymbopogon martini*, *Aristida funiculata*, and species of *Brachiaria*, *Eragrostis*, *Dicanthium*, *Digitaria*, *Setaria*, and *Bothriochloa*. The scattered trees found in the sanctuary area are *Prosopis chilensis*, *Ziziphus jujuba*, *Acacia catechuoides*, and *Butea monosperma*.

AVIFAUNA

Sailana Kharmor Sanctuary, as the name indicates, was established to protect the Endangered Lesser Florican *Sypheotides indicus*.

BNHS initiated studies on this bird in 1984. During these preliminary surveys, 15 floricans, mainly males were seen (Sankaran & Rahmani 1990). Intensive studies were

conducted from 1986 to 1989 (Sankaran & Rahmani 1990, Sankaran 1991). The area was going through a cyclic dry phase, and 1987 experienced extreme drought. The florican population declined, and by 1989 only 11 males were sighted. However, from 1991 onwards for almost a decade, the rainfall was normal or above normal, but florican numbers still declined mainly due to shrinkage of habitat. As the grassland habitat was converted into crop fields, there was successively less habitat available for florican. During a survey in 2002, only four to five males were seen (P.M. Lad, *pers. comm.* 2002). Records of floricans from different grasslands, some outside the notified sanctuary, are given in Sankaran *et al.* (1992) and BirdLife International (2001).

Besides the Lesser Florican, 125 species of birds have been reported from Sailana grasslands (Anon. 1990). In the 1980s, a pair of Sarus Crane *Grus antigone* was found in the sanctuary, and many more in the surrounding areas. According to P.M. Lad (*pers. comm.* 2003), a pair of Sarus was still seen around Sailana. Lesser Whistling Duck *Dendrocygna javanica* commonly breeds in the grasslands in the vicinity of wetlands, especially during normal monsoon years when the grass is tall. During winter, three species of harriers, *Circus macrourus*, *C. pygargus*, and *C. aeruginosus* are seen; sometimes as many as 40–50 gather to roost. Sailana grasslands are good breeding grounds for the endemic Sykes' Crested Lark *Galerida deva*.

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>

ENDANGERED

Lesser Florican	<i>Sypheotides indicus</i>
Egyptian Vulture	<i>Neophron percnopterus</i>

VULNERABLE

Sarus Crane	<i>Grus antigone</i>
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NEAR THREATENED

Painted Stork	<i>Mycteria leucocephala</i>
Pallid Harrier	<i>Circus macrourus</i>
European Roller	<i>Coracias garrulus</i>

Hundreds of European Roller *Coracias garrulus*, Blue-cheeked Bee-eater *Merops superciliosus* and Blue-tailed Bee-eater *Merops philippinus* are seen on passage migration. Vultures were very common in the 1980s but are now rarely seen. All species of vultures have declined, including Egyptian Vulture *Neophron percnopterus*.

In a census conducted in 1999 in Gujarat, Madhya Pradesh, and Rajasthan for the Lesser Florican, 63 individuals were recorded in Madhya Pradesh. The number declined to 12 in 2011 (the national figures were 238 in 1999 and 84 in 2010). In 2012, 28 floricans were seen, while the number fell to a mere 12 in 2013. It is believed that loss of grassland and change



DHRITIMAN MUKHERJEE

This small grassland sanctuary is found patches surrounded by agriculture fields. Besides the Endangered Lesser Florican 125 species of birds have been identified till now. Sailana is one of very few grassland sanctuaries of India

in cropping pattern in the region are also forcing them out of the IBA. In 2014, five males were sighted. The first florican arrived in Sailana on July 28, 2014 due to the delayed onset of monsoon (Ajay Gadikar, *pers. comm.* 2014).

OTHER KEY FAUNA

There is no large wild mammal remaining in Sailana and the surrounding areas except Nilgai. Golden Jackal *Canis aureus*, Indian Fox *Vulpes bengalensis* and Jungle Cat *Felis chaus* are the major predators of Lesser Florican and of other birds and Black-naped Hare *Lepus nigricollis*. Many species of snakes are found, including Cobra *Naja naja*, but none of them are of conservation concern as they are commonly found in many areas.

LAND USE

- Agriculture
- Human habitation
- Nature conservation and research

THREATS AND CONSERVATION ISSUES

- Human settlements
- Livestock grazing

Although Sailana Kharmor Sanctuary was properly notified and forest staff posted, no attempt was made to acquire the main grassland where the Lesser Florican used to breed. During the last 30 years or so, more than half of this grassland has been converted to crop fields, or is open to year-long livestock grazing.

During a survey in 1986, up to 45 male floricans were estimated to be present in Sailana and in private grasslands, but the population was reduced to less than 20 individuals in 2002 (P.M. Lad, *pers. comm.* 2002), as many private grass *beds* (grassland) were converted to crop fields.

Recently, this IBA has been listed as one of the IBAs in danger by BirdLife and BNHS (Kasambe & Surve 2013). It is reported that the numbers of the Lesser Florican are decreasing, making it difficult to spot. In Sailana, soyabean is cultivated near the florican breeding grounds, which needs regular application of pesticides. As floricans feed on insects, consuming insects sprayed with pesticides could be affecting them (Kasambe & Surve 2013). In order to arrest further decline of floricans and other grassland species, the Forest Department must purchase the remaining grasslands and manage them suitably. The produce from these grasslands should be given on subsidized rates to local farmers and livestock owners. Without appropriate protection, there is no future for the Lesser Florican in Sailana Kharmor Sanctuary.

Threats: The number of floricans could be declining due to constant loss of their habitat, which is grassland and pulse crop fields. Grasslands are being converted to cultivated fields due to the ever increasing demand for food grains.

Cultivation of pulses is being replaced by cultivation of soyabean. It has been observed that throughout the breeding grounds of florican, farmers spray pesticides extensively on the soyabean crop. Floricans depend heavily on insects and their larvae which are found in agriculture fields and grasslands. The use of chemical pesticides on crops possibly affects them.

The number of Nilgai *Boselaphus tragocamelus* in this region has increased and has reached pest proportions, affecting both farmers and floricans. Due to frequent raiding of crops by Nilgai, farmers no longer want to grow pulses and cereals, preferring to cultivate soyabean crops (on which Nilgai does not feed). But unknowingly, this is creating problems for the Lesser Florican. Also, large herds of Nilgai browsing over the entire habitat can damage the eggs of the ground nesting Lesser Florican. A check on their population is required.

Conservation Measures

The following conservation measures are being taken in the IBA (Jhunjhunwala & Gupta 2008):

Grazing: The Forest Department held talks with the land holders and found that they were ready to protect the grasslands if they were paid compensation and allowed to harvest and sell the grass fodder at the end of the Lesser Florican breeding season in November. The Department now leases the grasslands from the owners for the four monsoon months that coincide with the breeding season of the Lesser Florican. At the end of the monsoon, the owners are allowed to harvest and sell the grass, so they profit doubly. The Forest Department has also appointed watchmen to patrol the sanctuary.

Hunting: The Lesser Florican was a very popular game bird and was hunted for its delicate flesh. The male, specially while displaying, was hunted for sport. It is now protected under Schedule 1 of the Indian Wildlife (Protection) Act, 1972, but hunting continues with guns and snares, although the extent of the hunting pressure is not known.

Policy issues: In Dhar district, the bird is being deliberately persecuted by villagers living around Sardarpur Sanctuary in an attempt to get their land back from the government, which has been in the process of acquiring it for the sanctuary. After the initial notification of the sanctuary in 1983, no progress could be made for determination of rights to enable its final notification. Sale of land is banned and registration of land is not allowed. Anxiety levels have increased amongst the people, resentment for the florican runs deep as it is perceived as an enemy that is taking away their land. The villagers feel that if the bird disappears from the area, there will be no need for the Sanctuary and they will get their land back. Similar backlash is expected in Sailana Kharmor Sanctuary if controversial issues are not handled sensitively.

The Wildlife (Protection) Act (WPA) should be suitably amended to enable creating of large landscape sanctuaries, having a mosaic of habitats, private, semi-private, and government land, and where involvement and support of the local communities is integral. Some strict provisions of the WPA may not be applicable in such landscapes or people's protected areas. No acquisition of land should be done to set up such PAs.

Pesticide use: Insects and crop parts form a major part of the florican's diet. Excessive use of pesticides which leads to contamination of the diet may kill it or affect its breeding.

Exotic Invasive Species: Plant species *Lantana camara* and *Prosopis juliflora* are gradually spreading in the florican habitat.

Recommendations

The following recommendations have been made by Jhunjhunwala & Gupta (2008):

Incentive scheme for florican sighting: *Kharmor Batao Inam Pao* remains the most impressive programme, where a villager would be rewarded for showing a Lesser Florican in his agricultural field. He would be further rewarded for providing protection till the end of the breeding season (Bhardwaj *et al.* 2011).

It is recommended that the verification and payments for the sighting should be done by the Forest Department speedily so as to not offend land owners. We also suggest that the Rs.5,000 reward be phased as follows in the florican display season: Down payment of Rs 2,000 to be made on first sighting, the rest to be given in installments of Rs.1,000 for each month the bird displays in the field. We also recommend a reward of Rs. 1,000 to anyone who spots a florican in a new area every year, and not be limited to the land owners. A mechanism can be worked out to split the reward with the farm owner. The reward scheme needs to be supported by an outreach programme for it to become popular.

Exotic Invasive Species: There is a need for a structured management programme for the two exotic invasives *Lantana camara* and *Prosopis chilensis*.

For Researchers: Florican movement in the non-breeding and breeding season should be studied by satellite tracking.

For Conservation Education Organizations: Widely dispersed species cannot be conserved without the support of the communities they share their habitat with. Collaborations are needed between government department and NGOs specializing in outreach programmes.

For Policy Makers: It is urgent to develop a policy for widely dispersed species that encompasses a mosaic of protected areas and landscape conservation.

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Asad R. Rahmani, Ravi Sankaran, P.M. Lad, Sangeeta Rajgir, M. Khaliq, Ajay Gadikar.

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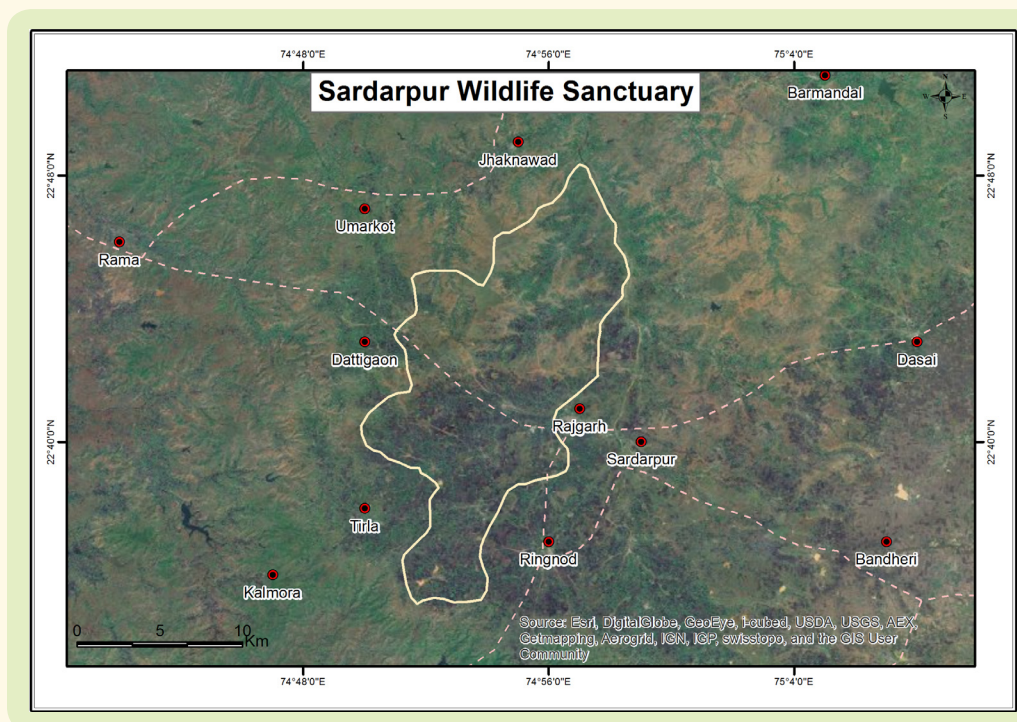
SARDARPUR WILDLIFE SANCTUARY

IBA Code	: IN-MP-16	Area	: 34,812 ha
Administrative Region (State)	: Madhya Pradesh	Altitude	: c. 500 m
District	: Dhar	Rainfall	: 1,200 mm
Coordinates	: 22° 35' 53" N, 75° 12' 21" E	Temperature	: 10 °C to 43 °C
Ownership	: State	Biogeographic Zone	: Semi-arid
		Habitats	: Tropical Grassland

IN-MP-16

IBA CRITERIA: A1 (Threatened species).

PROTECTION STATUS: Wildlife Sanctuary, established June, 1983.



GENERAL DESCRIPTION

Sardarpur Wildlife Sanctuary also called Khamor Sanctuary was established on the recommendations of Sâlim Ali for the protection of the Lesser Florican *Sypheotides indica*. A survey was conducted during 1981 by P. M. Lad, the then Director, Van Vihar, Bhopal, and later Conservator of Forests, on the recommendation of Sâlim Ali. During this survey, it was found that the Lesser Florican is present in around 14 villages near Sardarpur *taluka* in Dhar district. Accordingly, a sanctuary was constituted and notified vide order No. 2410-X-2-83, dated June 4, 1983 by the Government of Madhya Pradesh.

Sardarpur is located close to Rajgarhnagar on the Indore-Ahmedabad road, about 55 km from the district headquarters of Dhar and 125 km from Indore.

Most of the area of the Sanctuary is treeless, and dominated by the grass species *Sehimanervosum-Chrysopogon fulvus*

type. Other grass species are *Heteropogon contortus*, *Apluda mutica*, *Cymbopogon martini*, *Aristida funiculata* and species of genera *Bracharia*, *Eragrostis*, *Dicanthium*, *Digitaria*, *Setaria*, and *Bothriocloa*. *Prosopis chilensis*, *Zizyphus jujuba*, *Acacia catechu* and *Butea monosperma* trees are found growing singly in the Sanctuary area.

Considering the deteriorating status of the Lesser Florican and its vanishing grassland habitat, and also total neglect by the authorities, Sardarpur Khamor Sanctuary is an IBA in Danger.

AVIFAUNA

The Lesser Florican is seen only during the breeding season. It arrives at the onset of monsoon by the end of June or beginning of July, and leaves by the end of October or in November.

A mosaic of grasslands and agricultural fields are



Involvement of farmers is absolutely necessary for the protection of Lesser Florican in Sardarpur Wildlife Sanctuary

present in this Sanctuary. The Florican is mostly found in protected grasslands. During 1984, nine males were sighted in Chadawat, Dhulat-Rajabheda, Karnawat and Pipami grasslands, while 7 were seen in 1989 (Sankaran and Rahmani 1990). In the 2,700 ha Panpura grasslands, no florican was sighted at that time. But now, 4-8 males are regularly seen (P. M. Lad *pers. comm.* 2002). As private and government grasslands have decreased in size and deteriorated in quality due to over-grazing, the birds could have shifted to Panpura, which is protected by the Forest Department.

No work has been done on the bird life of this Sanctuary but it could not be very different from Sailana Kharmor Sanctuary.

No Lesser florican has been recorded during the last two years (2013 and 2014) at the Sardarpur sanctuary. This was mainly due to the scarcity of birds now and also delay in the monsoon due to which grasses could not come up well. However, Montagu's *Circus pygargus* and Pallid *C. macrourus* harriers are seen in good number.

ENDANGERED

Lesser Florican

Sypheotides indica

NEAR THREATENED

Pallid Harrier

Circus macrourus

OTHER KEY FAUNA

Sardarpur Wildlife Sanctuary does not have large ungulates or predators (except for a stray record of Leopard *Panthera pardus*). Smaller mammals include the Golden Jackal *Canis aureus*, Indian Fox *Vulpes bengalensis*, and Northern Plains Gray Langur *Semnopithecus entellus*.

LAND USE

- Agriculture
- Human habitation
- Nature conservation and research

THREATS AND CONSERVATION ISSUES

- Human settlements
- Livestock grazing
- Water scarcity

After the initial notification of the Sanctuary under Section 18, no progress could be made under Section 19 to 25 (for determination of rights) to enable its notification under Section 26-A. After intervention by the Supreme Court, efforts were made to start proceedings under Section 19 to 25. During 1991, amendments were made in the Wildlife (Protection) Act 1972 (WPA). Meanwhile, difficulties were experienced by local people in transfer of their own proprietary land (*bhoomi swami* land) due to the provisions of Section 20 of the WPA. Therefore, a section of villagers demanded that their villages should be excluded from the Sanctuary area. The Cabinet Sub-committee of Madhya Pradesh state deliberated on this issue and decided that the proposals to rationalize areas of national parks and sanctuaries may be examined by a technical experts committee. Accordingly, a committee was constituted for the rationalization of the Kharmor Sanctuary.

The Committee examined the Amendments made to the Act during 1991 and 2002. A provision has been made in the WPA under Section 24, that in certain cases rights of local people can continue within the limits of a sanctuary in consultation with the Chief Wildlife Warden of the State. In the present case, it is not advisable to exclude any area of the Kharmor Sanctuary keeping in view the requirement of this globally threatened species, listed as Endangered species in the Red Data Book of the IUCN (World Conservation Union). Secondly, it is also not advisable and desirable to acquire private crop fields because it would cause misery to the local people, and would require massive financial resources which are not available. Therefore, to accommodate the requirements of the florican and the local community, the Committee recommended that:

The local people should be permitted to exercise their rights on their land under Section 24(c). Within the Sanctuary area some revenue grasslands (defined as forest under the definition provided by the Supreme Court) should be identified and handed over to the Forest Department so that a mosaic of grasslands and cultivation is maintained. There is no need to denotify any part of the Sardarpur Kharmor Sanctuary.

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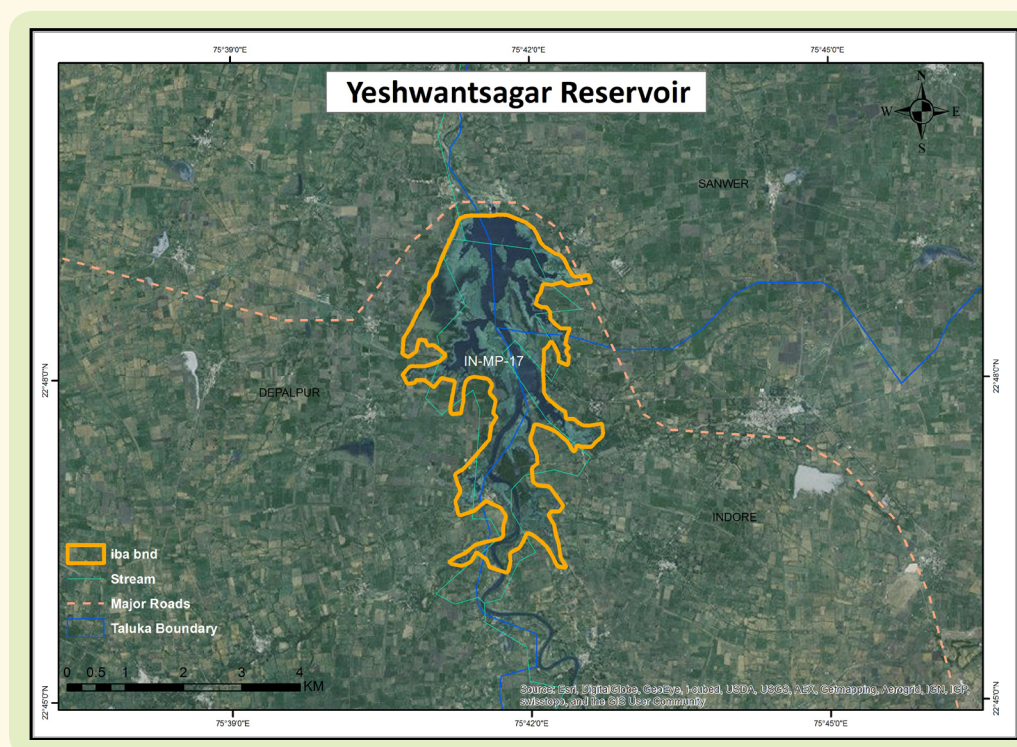
YESHWANTSAGAR RESERVOIR

IBA Code	: IN-MP-17	Area	: 14,000 ha
Administrative Region (State)	: Madhya Pradesh	Altitude	: 535 msl
District	: Indore	Rainfall	: 1,050 mm
Coordinates	: 22° 49' 00" N, 75° 40' 60" E	Temperature	: 12 °C to 43 °C
Ownership	: Irrigation Department, Indore Municipal Corporation	Biogeographic Zone	: Semi-arid
		Habitats	: Freshwater Reservoir

IN-MP-17

IBA CRITERIA: A1 (Threatened species), A4i ($\geq 1\%$ of biogeographic population of waterbirds), Data Deficient.

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

The erstwhile ruler of Indore state created Yeshwantsagar Reservoir in 1939 to meet the growing needs of the city. Made by the construction of a dam on the Gambhir river, the reservoir is situated c. 21 km from Indore, which is also known as the business capital of Madhya Pradesh and is well connected by both air and rail routes. Water from the reservoir is mainly used for irrigation and drinking purposes, and supports the requirement of Indore, which is shared by the Narmada river as well.

Open fields on almost all sides surround Yeshwantsagar Reservoir. The main cultivation is wheat, corn, pulses, and cash crops. The terrain is mostly flat and devoid of undulating areas. Aquatic vegetation comprises mostly *Ipomoea*, water lily, lotus, and reeds. The reservoir is mostly shallow, good for waders and other waterfowl. As the water

level recedes, many islands are created that serve as roosting sites for waterfowl.

AVIFAUNA

Due to its vast shallow reedbeds, the wetland is a haven for large numbers of birds in winter and in summer. Large congregations of Sarus Crane *Grus antigone*, with numbers exceeding 170, are reported from the site, apart from several nesting pairs (Gopi Sundar *et al.* 1999). This number, being more than 1% of the biogeographical population of the species, qualifies the site as an IBA. The Sarus population at Yeshwantsagar formed the major population among all Sarus Cranes counted in Madhya Pradesh (Gopi Sundar *et al.* 2000). Later, a similar congregation was reported from the Upper Lake of Bhopal (Koustubh Sharma, *pers. comm.* 2002).



In Madhya Pradesh Yeshwant Sagar Reservoir is an important nesting and wintering ground of Sarus Crane. Unfortunately in the surrounding fields were the Sarus forages frequently, pesticide is heavily used. There are few cases of Sarus death due to pesticides

VULNERABLE

Sarus Crane

Grus antigone

As no proper survey has been done on the avifauna of the area, it may be classified as Data Deficient.

LAND USE

- Tourism and recreation
- Fishing
- Irrigation and potable water

THREATS AND CONSERVATION ISSUES

- Pollution
- Use of pesticides
- Increasing trend to shift from traditional crops to cash crops
- Tourism

Yeshwantsagar Reservoir, being close to a populous city, invites thousands of picnickers throughout the year. Pollution caused by these tourists is a major threat, as large amounts of plastic and other junk litter the banks of the reservoir close to the road from Indore. Submerging of Plaster-of-Paris and clay idols, degradable and non-degradable garbage, and the use of toxic pesticides for agriculture, all pose an alarming threat to the wetland habitat.

The impact of changing water levels in the reservoir on Sarus populations is unknown and could form an important and interesting study (Gopi Sundar *et al.* 1999). Sarus Crane enjoys protection from farmers, due to the traditional belief

that it forms lifelong pair bonds. However, the impact of changing cultivation and agricultural techniques seems to be affecting the population. As Yeshwantsagar is a stronghold of the Sarus, it becomes extremely important for the species' conservation

1. Since the last many decades, Sarus Crane is resident in this IBA, which is one of their last breeding grounds in and around the many districts of Malwa region.
2. Every year during May-June, large congregations of Sarus Crane are seen in this wetland. Flocks of 20–30 are seen in the open areas.
3. Major threats are stealing of Sarus Crane eggs, and shrinking habitat due to use of their breeding grounds for farming by the local villagers.
4. The highest count for the last four to five years is approximately 50 to 60 Sarus only.

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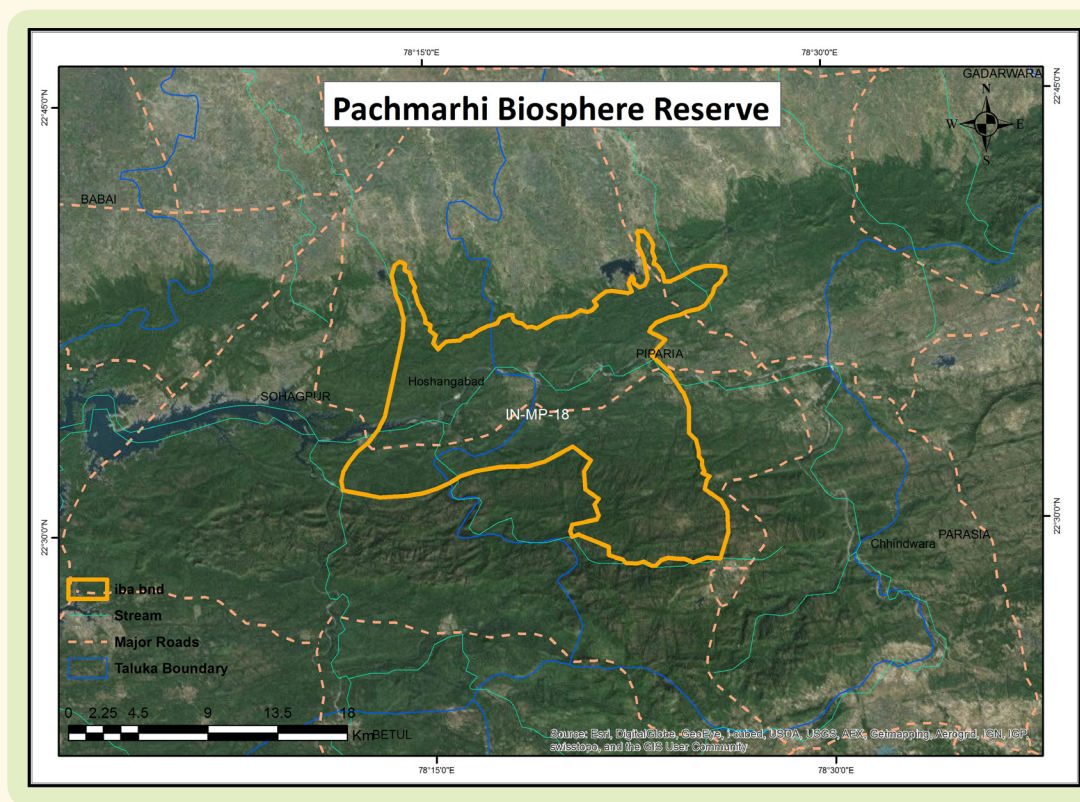
PACHMARHI BIOSPHERE RESERVE

IBA Code	: IN-MP-18	Altitude	: 320-1352 msl
Administrative Region (State)	: Madhya Pradesh	Rainfall	: 1,173 mm
District	: Hoshangabad, Betul and Chhindwara	Temperature	: 4 °C to 42 °C
Coordinates	: 22° 11' 22" N, 77° 59' 00" E	Biogeographic Zone	: Deccan Peninsula, Biotic Province - Central Highlands (6A)
Ownership	: State	Habitats	: Tropical Moist Deciduous Forest, Central Indian Sub-tropical Hill Forest, Dry Deciduous Forest
Area	: 498,738 ha		

IN-MP-18

IBA CRITERIA: A1 (Threatened Species), A3 (Biome 11: Indo-Malayan Tropical Dry Zone).

PROTECTION STATUS: National Park, established in 1981. Includes Bori Wildlife Sanctuary (485.72 sq. km), Satpura National Park (524.37 sq. km), and Pachmarhi Wildlife Sanctuary (417.78 sq. km). In May 2009 UNESCO added Pachmarhi National Park to its list of Biosphere Reserves.



GENERAL DESCRIPTION

Pachmarhi Biosphere Reserve (PBR) lies in between latitude 22° 11' to 22° 56' N and 77° 47' to 78° 52' E longitude and covers three civil districts of Madhya Pradesh: Hoshangabad, Betul and Chhindwara. The total area is 4,987 sq. km. It includes three protected areas namely, Bori Wildlife Sanctuary (485.72 sq. km), Satpura National Park (524.37 sq. km), and Pachmarhi Wildlife Sanctuary (417.78 sq. km). The area (1,427 sq km) comprising Satpura N.P., Bori WLS, and Pachmarhi WLS, was notified as Tiger

Reserve in August 2000. Satpura National Park comprises the core zone and the remaining area of 4,525.93 sq. km serves as buffer zone.

The habitat is hilly undulating terrain and at places precipitous having deep gorges around Mahadev hills in the Pachmarhi plateau. The Satpura hill ranges run east to west, and the Pachmarhi plateau is practically in the centre of the area having an elevation of around 1,050 m. Pachmarhi hills have steep slopes in north and south. Jambudweep, Dhooogarh, Handikho, Mahadev, Chauragarh and Bee

Fall are some of the hilly areas. Amongst these Dhoopgarh is the highest point (1,352 msl) in the State. The mean daily maximum temperature ranges from 26 °C to 42 °C in summer, and minimum 9.7 °C to 25 °C in winter.

The area is a junction of forest representative types prevailing in the state. It is a natural junction of two most important timber species viz. Teak *Tectona grandis* and Sal *Shorea robusta*. The forest can be broadly classified into three major types, viz. Moist Deciduous Forest, Central Indian Sub-tropical Hill Forest and Dry Deciduous Forest. It can further be classified into seven types based on microclimatic conditions, soil types, and topographical features. The Central Indian Sub-tropical Hill Forest is confined to the hill tops of Pachmarhi plateau, specifically in Pachmarhi WLS. The site is exposed and having very poor soil. The area support more xerophytic vegetation that closely resembles the tropical dry deciduous forests though rather enriched by higher proportion of evergreen vegetation.

The PBR area is rich in plant diversity. As many as 37 species of epiphytic mosses and 46 species of terrestrial mosses, 57 species of bryophytes, 94 species of pteridophytes, 7 species of gymnosperms, 1,190 species of angiosperms (flowering plants) have been reported in the area. About 50 species of angiosperms are yet to be identified. The flora as known today is belongs to 180 families of which 54 are represented by just one genus each, and 29 are represented by two or three genera each.

AVIFAUNA

Osmaston (1922a) worked extensively in Pachmarhi area and reported many species of birds, including, Wedge-tailed Green-pigeon *Sphenocercus sphenurus*, Large-billed Leaf-warbler *Acanthopneuste magnirostris*, Asian Paradise Flycatcher *Terpsiphone paradisi*, Indian Pitta *Pitta brachyuran*, Indian Cuckoo *Cuculus micropterus*, Common Cuckoo *Cuculus canorus*, Brown Fish-owl *Ketupa zeylonensis*. He also reported five vulture species including the Red-headed Vulture *Aegypius calvus*, Long-billed Vulture *Gyps indicus*, White-rumped Vulture *Gyps bengalensis*, Griffon Vulture *Gyps fulvus*, and Egyptian Vulture *Neophron percnopterus*. He also reported the occurrence of Blue-bearded Bee-eater *Nyctiornis athertoni* (Osmaston 1922b).

A recently published document mentions presence of 254 species of birds in Pachmarhi Biosphere Reserve (Anon. 2001). The steep vertical scarps are home to numerous raptors such as Oriental Honey-buzzard *Pernis ptilorhynchus* and Black Eagle *Ictinaetus malaiensis*. Long-billed Vulture *Gyps indicus* nests on the cliffs in Mahadev hills.

These forests have both Grey Junglefowl *Gallus sonneratii* and Red Junglefowl *G. gallus* which are usually found separately in south and north India, respectively. Among the other birds represented are Malabar Pied

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Asian Woollyneck	<i>Ciconia episcopus</i>
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NEAR THREATENED

Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

Red-naped (Black) Ibis	<i>Pseudibis papillosa</i>
White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius calvus</i>
White-eyed Buzzard	<i>Butastur teesa</i>
Painted Francolin	<i>Francolinus pictus</i>
Rain Quail	<i>Coturnix coromandelica</i>
Jungle Bush-quail	<i>Perdica asiatica</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>
Yellow-legged Green-pigeon	<i>Treron phoenicopterus</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Sirkeer Malkoha	<i>Phaenicophaeus leschenaultia</i>
Indian Grey Hornbill	<i>Ocyrceros birostris</i>
Brown-headed Barbet	<i>Megalaima zeylanica</i>
Yellow-fronted Pied Woodpecker	<i>Dendrocopos mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalensis</i>
White-naped Woodpecker	<i>Chrysocolaptes festivus</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Black-headed Cuckooshrike	<i>Coracina melanoptera</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
White-browed Fantail	<i>Rhipidura aureola</i>
Indian Robin	<i>Saxicoloides fulicata</i>
Jungle Babbler	<i>Turdoides striatus</i>
Ashy Prinia	<i>Prinia socialis</i>
Jungle Prinia	<i>Prinia sylvatica</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
Grey-headed Starling	<i>Sturnus malabaricus</i>

Hornbill *Anthraceroceros coronatus*, and Malabar Whistling-thrush *Myophonus horsfieldii*.

The site is selected as an IBA mainly due to the presence of nesting colonies of Long-billed Vulture, and regular sightings of White-rumped and Red-headed Vultures. The site is also very good representative of Biome 11. Twenty-nine out of 59 species of this biome have been listed till now but more are likely to be present.

OTHER KEY FAUNA

The Satpura National Park as well as Bori and Pachmarhi Wildlife Sanctuaries have good populations of wildlife. Historically mammals like Asiatic Lion *Panthera leo persica*, Asiatic Elephant *Elephas maximus*, Wild Buffalo

Bubalus arnee, and Barasingha *Rucervus duvaucelii* were present in the area (Forsyth 1919). However, these animals have disappeared now. Most of the Pachmarhi BR is covered with dense forest vegetation and forms an ideal habitat for wild animals. Over 50 species of mammals, 30 species of reptiles, 50 species of butterflies and numerous other species of animals are found in the area. The presence of numerous streams, dense foliage wild flowers, woodland edges and damp patches attract butterflies including Orange Oakleaf *Kallima inachus*, Black Rajah *Charaxes solon*, and Great Eggfly *Hypolimnas bolina*.

Sujatha (2002) has reported the occurrence of 107 species of pteridophytes belonging to 18 families. This area is considered as one of the richest floras of India representing both north and south floras. She has listed 14 species of threatened plant species in the reserve.

LAND USE

- Conservation
- Agriculture
- Tourism

The land use of the area based on Landsat Imagery of April 1990 and November-January 1991-92 shows the following data: forest (65.2%), agriculture (27.7%), water bodies (4.2%), wasteland (2.5%) and built-up land (0.5%). Of the total forest cover, the closed forest constitutes 85.3%, open forest 8.2%, degraded forest 4.2% and grasslands 2.3%.

The Tawa reservoir is the major constituent of the water bodies. It attracts thousands of waterbirds.

THREATS AND CONSERVATION ISSUES

- Unrestricted livestock grazing
- No control on fuel wood collection
- Religious tourism, resulting in garbage and disturbance
- Unsustainable collection of medicinal plants
- Botanical excursions and other collections by colleges
- Spread of invasive alien species

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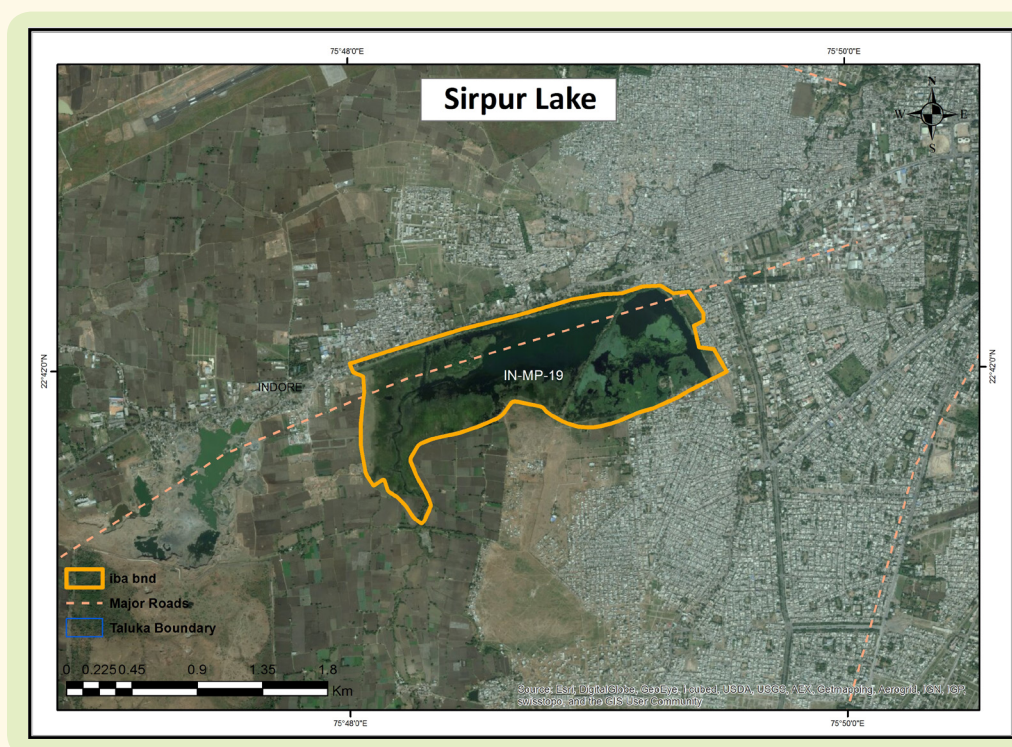
SIRPUR LAKE

IN-MP-19

IBA Code	: IN-MP-19	Area	: 260 ha
Administrative Region (State)	: Madhya Pradesh	Altitude	: 553 msl
District	: Indore	Rainfall	: c. 945 mm
Coordinates	: 22.7253° N, 75.8655° E	Temperature	: 2°C to 44 °C
Ownership	: Indore Municipal Corporation (IMC)	Biogeographic Zone	: Deccan Plateau, Central India.
		Habitats	: Wetland

IBA CRITERIA: A1 (threatened species), (A4iii (>20,000 waterbirds))

PROTECTION STATUS: Under the protection of Indore Municipal Corporation.



GENERAL DESCRIPTION

Sirpur is a 260 ha urban lake in a city of 2.5 million population. The Sirpur Lake was developed by the erstwhile rulers of Indore State, Holkars, mainly as a source of water. The Holkar ruler with great foresight converted about 540 acres of low lying area by building embankment to retain the rain water. The Lake is located on the Indore-Dhar highway, and the catchment is spread in the south-eastern side of the Lake and mainly occupied by agricultural fields of villages, Ahirkhedi and Rangwasha. The water is no more potable but the Lake is important for maintaining the ground water recharge, for biodiversity, particularly birds and for limited recreational use. The lake is now under the control of the Indore Municipal Corporation. The water level of the lake is being maintained by sluice gates. Due to extension of the township, the Lake is now more or less inside the city. Some

citizens want this lake to be drained and the land developed for housing and industrial use.

Other important waterbodies in the vicinity of Indore are Billawali Irrigation tank, Yashwantsagar and Pipliapala Irrigation tank. While Billawali Irrigation tank and Yashwantsagar are situated in the outskirts of Indore, Pipliapala and Sirpur are located well within the city. Islam and Rahmani (2008) have suggested Sirpur, Pipliapala and Baillawali tanks as a Ramsar Site complex, while Yashwantsagar (IBA) should be declared as another Ramsar Site.

Twenty years earlier the lake was in a bad shape with many encroachments. The environmental NGO “The Nature Volunteers” undertook the project of cleaning up and protecting the lake in collaboration with Indore Municipal Corporation (IMC). The lake is in a healthy state as testified



BHARU MONDHE

Despite the fact the Sirpur Lake is now almost surrounded by human habitation, it is still attracts thousands of waterfowl. During the last few years Indore Municipal corporation, with the help of NGO's and other department, has taken conservation measures to improve the condition of the lake

by the large numbers of migratory and local birds totaling 130 species.

AVIFAUNA

Nearly 130 species of birds have been identified from Sirpur Lake and surrounding areas (Mondhe *et al.* 2012). This includes 64 wetland-dependent birds. Critically Endangered White-rumped *Gyps bengalensis* and Long-billed *G. indicus* vultures have now more or less disappeared but Endangered Egyptian Vulture *Neophron percnopterus* is regularly seen on garbage dumps, particularly in summer when there is less water. Amongst the Vulnerable species, Sarus *Grus antigone* is a resident bird and breeds in the area. Asian Woollyneck *Ciconia episcopus* is also found throughout the year but nest has not been found.

Although at any given time, 20,000 waterbirds are not found, and the count does not exceeds 15,000 birds, considering the movement of birds, in a year more than 20,000 waterbirds use Sirpur wetland, therefore, qualifying it A4iii criteria of BirdLife International. If we consider waterbirds of Sirpur, Billawali Irrigation tank, Yashwantsagar and Pipliapala Irrigation Tank, the total will far exceed the number 20,000. Sometimes huge numbers of Northern Pintail *Anas acuta*, Northern Shoveller *Spatula clypeata*, Garganey *Querquedula querquedula*, Gadwall *Mareca strepera*, Eurasian Wigeon *Mareca penelope*, Red-crested Pochard *Netta refina*, Common Pochard *Aythya ferina* and Common Teal *Anas crecca* appear for few days on their southward migration. While most of them remain in Sirpur in depleted numbers throughout winter, Garganey is not seen till some appear again in spring. Near Threatened Ferruginous Pochard *Aythya nyroca* occurs in small numbers of few dozens to few hundreds. Some

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Asian Woollyneck	<i>Ciconia episcopus</i>
Sarus Crane	<i>Grus antigone</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Ferruginous Pochard	<i>Aythya nyroca</i>
Black-tailed Godwit	<i>Limosa limosa</i>
River Tern	<i>Sterna aurata</i>

of the above-mentioned species perhaps occur in greater number than their 1% population threshold as determined by Wetlands International (2012), but good population estimates are lacking from Sirpur Lake.

All the four resident duck species breed in Sirpur. They are Comb Duck, now called Knob-billed Duck *Sarkidiornis melanotos*, Lesser Whistling Duck *Dendrocygna javanica*, Indian Spot-billed Duck *Anas poecilorhyncha*, and Cotton Pygmy-goose *Nettapus coromandelianus*. In winter, small flocks of Greylag Goose *Anser anser* are seen, in some years, throughout winter.

Thanks to the improvement of the ecological conditions of the Lake, now Sarus Crane *Grus antigone* and Greater Flamingo *Phoenicopterus roseus* are regularly seen and increasing numbers. They stay in the lake for a longer period.

OTHER KEY FAUNA

As it is now an urban lake, there are not many mammal

species but snakes, lizards, turtles, bats, butterflies are found. Golden Jackal *Canis aureus* is the only noteworthy mammal that used to occur here earlier but it is also gone due to urbanization all around.

LAND USE

The land is now protected and has a boundary wall and wire fencing. Guards employed by the IMC provide round the clock protection. Part of the land had been encroached before the revival of the lake was commenced. A large number of trees (more than twenty thousand) have been planted here. An Interpretation Centre is also being planned in a two acre plot of land.

THREAT AND CONSERVATION ISSUES

- Industrial and sewer pollution
- Solid waste management
- Encroachment and industrial Development in the catchment area
- Inflow of untreated sewage and wastewater
- Siltation

The Sirpur Lake is under tremendous biotic pressure, mainly due to its location near a thriving, growing industrial town. Its water which was at one time potable is now too polluted for human consumption. The lake is now mainly used for recreation, and religious and ritual performance which add to pollution. The lake receives untreated sewage and waste water generated from the surrounding encroachments, some of them on the submergence level of the Lake. The southern part of the lake has been developed as settlements on the fringes of the water line.

Numerous channels drains in Sirpur Lake which brings heavy silt load, particularly during monsoon, thanks to denudation of the catchment area. Siltation has decreased the water holding capacity of the Lake and also increased the nutrient load, as lot of water is drained from agricultural fields. The catchment area of the Sirpur Lake consists of mainly black cotton soil which has erosion tendency, particularly if the vegetation cover is removed.

As Sirpur Lake adjoins the city, all type religions rituals that need to be performed near water sources take place here. Although the main idol immersions take place during Navaratri and Ganesh Chaturdashi, twice a year, other rituals go on throughout the year. According to the recommendation of the Lake Conservation Authority of Madhya Pradesh, “idol immersion activity should be diverted elsewhere so as to control the lake pollution.”

The water supply to the Indore city is through Narmada River and Yashwantsagar (another IBA and proposed Ramsar Site). The third source of potable water mainly



BHALU MONDHE



BHALU MONDHE

Under the leadership of Abhilash Khandekar and Bhalu Mondhe, The Nature Volunteers, a local NGO, has highlighted the importance of Sirpur Lake as a result of which it has become a tourist destination

in semi-rural areas is groundwater. This groundwater is chiefly maintained through waterbodies such as Sirpur Lake, Pipliapala, Billawali and Yashwantsagar. Therefore it is in the interest of people to maintain and enhance these waterbodies by their wise use through declaring them as Ramsar Sites.

Despite many conservation issues, Sirpur Lake is now in much better condition thanks to the constant efforts of The Nature Volunteers, a local NGO, and Government of Madhya Pradesh. Encroachment has been controlled and now many citizens see Sirpur Lake in a positive way. In the highly industrialized city of Indore, Sirpur Lake is the only ‘green lung’ left. A management plan of Sirpur Lake has been prepared by the Lake Conservation Authority of Madhya Pradesh, Bhopal.

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Abhilash Khandekar, Bhalu Mondhe, Kaustubh Rishi

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